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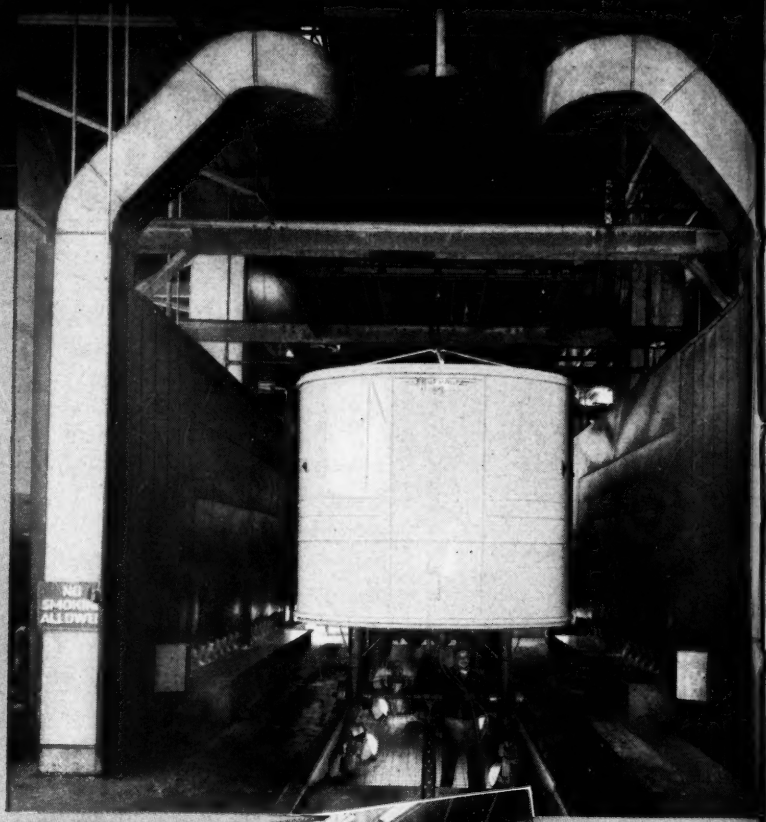
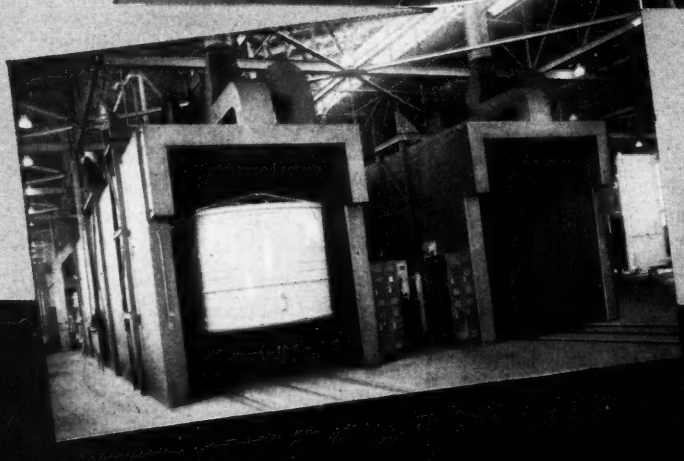




At Right Above: Finish C... Hydro-Filter Spray Boo... and Baking Ovens in T... Finishing Production Lines... Part of a Complete Mob... Finishing System 1750 ... Long at Fruehauf's N... Plant, Avon Lake, O... Above: Fruehauf Truck Tra... ers Passing Through Mob... Hydro-Filter Chassis Spra... Booth—Part of the Sc... Installation.

M

Pf editorial

MARCH, 1949

Vol. 13, No. 6

Design For Finishing

Now that the practice of announcing annual new models of automobiles and household appliances for the consideration of the buying public has returned to the industrial scene, finishing supervisors can return to their pre-war habit of "sweating out" each new model until they can determine under actual production conditions that the new model can be finished successfully.

Porcelain enamelers have long known that panels not properly reinforced or of insufficient rigidity, sharp edges and welds are all difficult to enamel successfully and yet designers persist in building into the product just such sources of potential finishing difficulty and scrap.

Parts to be plated must be designed so that plating solutions will drain properly during the plating process and so that any gas formed during the plating operations can escape easily from the racked parts. Parts with sharp edges or deep recesses make polishing and plating more difficult. Then too, excessive wear is usually experienced on the edges throughout the life of the product. Adequate provision must be made so that racking for plating may be accomplished quickly and satisfactorily. Modern high production plating installations require that parts be racked and unracked quickly so that no loss of time occurs in this operation.

Painting foremen usually find two problems particularly troublesome; namely, the problem of spraying paint inside large objects which are not vented and which make it difficult to properly apply a smooth film of paint; and also painting of sharp edges, which are not only difficult to paint but are a source of potential trouble throughout the life of the product because of the abnormal wear usually experienced on such areas.

It would seem, in line with our industrial progress, that long ago the simple design principles essential to successful finishing would have been generally recognized and rigidly practiced. However, it appears that a little more thought and effort along these lines are still desirable.

E. A. Blount

Finishing

THE LUSTRON HOME

PART I

Structural members, such as wall sections and roof trusses, are given a rust resisting phosphate treatment and a protective organic coating in the world's largest flow coat painting installation.

By EZRA A. BLOUNT

PF FEATURE

In the United States the idea of manufacturing an all-steel pre-fabricated home by mass production fabricating and finishing methods is a "natural." That idea is being transformed into fact by the Lustron Corporation, Columbus, Ohio, in a plant designed and equipped to build 45,000 homes per year, and destined to be an industrial show place from the standpoint of plant size, arrangement, and employment of the latest developments and techniques in organic finishing and porcelain enamel processing.

The plant represents one of the more ideal instances of war plant conversion in that a plant, built during the war and operated by the Curtiss-Wright Corporation to produce a critical war-time need, airplanes, has now been converted to produce a critical peace time need, homes. The manufacturing facilities, well suited to the production of large objects such as house

This article is the first of a series describing the finishing operations at the plant of the Lustron Corporation. Succeeding installments will describe porcelain enameling operations and other finishing processes.

sections, are housed in two large plants, built without departmental partitions, and providing a clearance of 35 feet between the floor and the lowest ceiling beams. A balcony along one side of the larger plant building is used for a considerable amount of storage, fabricating, and finishing. The large unobstructed floor area and high ceilings make possible the efficient installation of production equipment and contribute much to plant appearance and employee comfort.

The 1,100,000 square feet of floor space in the former war plant was entirely empty as of March 1948, yet by January 1949 over $13,000,000 worth of fabricating and finishing equipment, much of which had to be specially designed, had been installed and homes were being shipped out of the plant on a regular schedule, ready for assembly on the home site. It is believed that this installation job may have set a new record in industrial history, taking into consideration the size and kind of equipment involved.

The Flow Coat Installation

Visitors to the Lustron plant hear the words "world's largest" repeatedly. By the time they reach Plant B, they are not surprised to be told that the equipment installed in one section of that 1,000-foot by 200-foot plant at a cost of $500,000, constitutes the

Fig. 1—An interior view of the living room of the completed Lustron Home

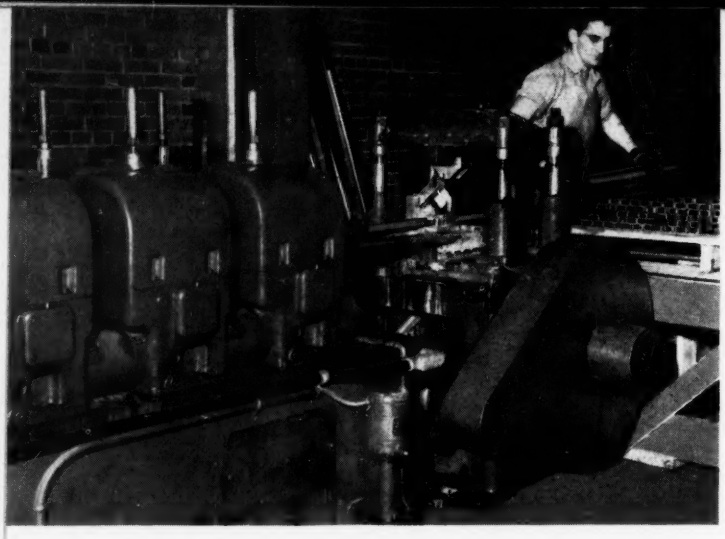
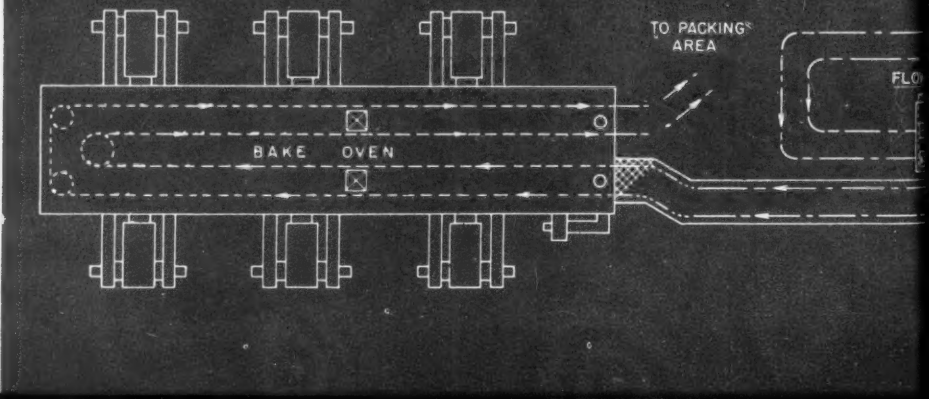


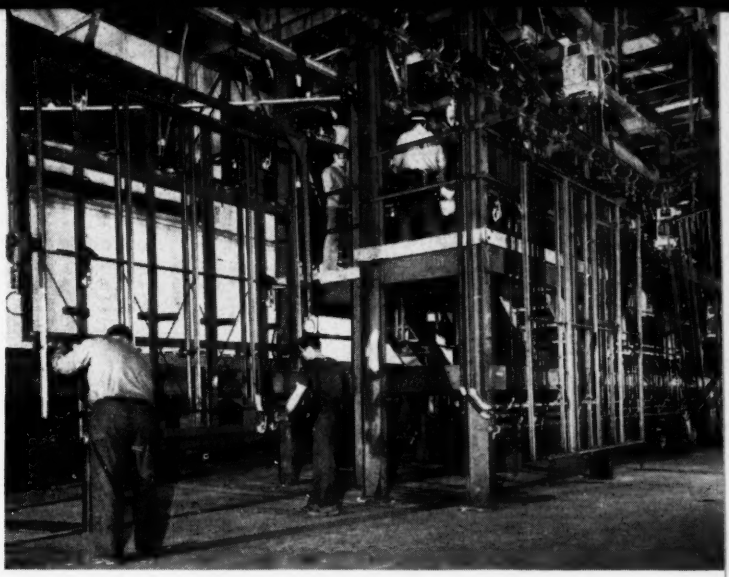
Fig. 3—One of the Yoder rolling machines installed in the Lustron plant through which strip steel is fed from a coil, roll formed, and cut to length by the flying cut-off attached to the machine. All the operator needs to do is remove the finished parts from the machine.

world's largest installation for the application of paint by means of the flow coating process. The four processing units making up the installation, the spray Bonderite tunnel, the dry-off oven, the flow coat machine, and the baking oven, are 30 feet high overall with 20-foot clear openings, and wide enough to permit twin overhead chain conveyors to carry structural members such as wall sections and roof trusses through the entire automatic finishing process. Figure 2 is a floor plan indicating the location and arrangement of these processing units.

Structural parts are purchased or are fabricated from flat stock in Yoder roll formers equipped with automatic flying cut-offs, as shown in Fig. 3. Wall sections are assembled by weld-

Fig. 2—A plan view (not to scale) showing the relative size and arrangement of the processing units which make up the flow coat installation





ig. 4—Wall sections
the Lustron Home
e assembled by spot
elding in a three-
el welding assem-
y unit. The formed
uctural members
e placed in jigs or
tures prior to weld-
g and conveyed
rough the welding
eration on an over-
ad run-around con-
yor. After welding,
e sections are trans-
rred to the conveyor
hich carries them
rough the finishing
operations.

g together the various pre-cut parts a run-around overhead conveyor, ing resistance welding equipment. s can be seen in Fig. 4, welding oper- ions are conducted simultaneously three levels. Roof trusses are as- mbled by resistance or spot welding one of two special welding jigs, as ustrated in Fig. 5. After assembly lding, the structural parts are nsferred to one of the twin process- ing conveyors. These conveyors trans- port parts through the entire flow coat installation and then to the packing area where finished house parts are grouped for shipment.

Suspended from an overhead proc- essing conveyor, which may be set for speeds varying from 4 to 12 feet per minute, parts enter the 124-foot long (8 feet wide) cleaning and phosphatiz- ing tunnel shown in Fig. 6. Moving at

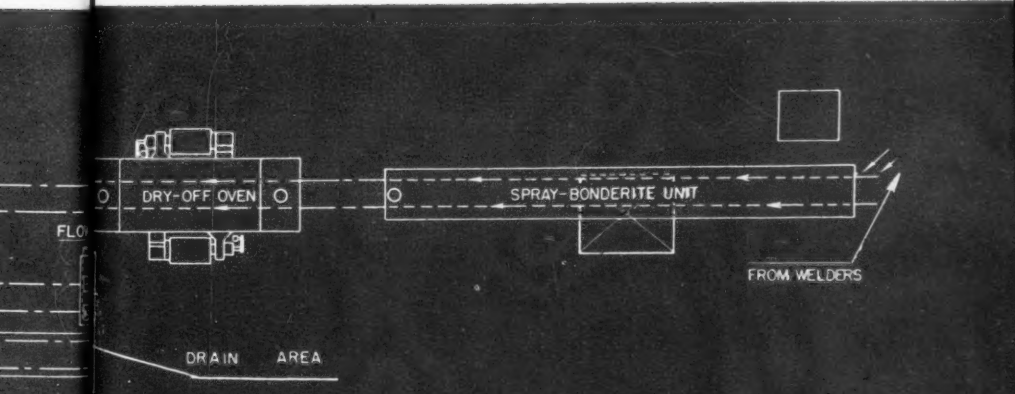


Fig. 5—Roof trusses are assembly welded by means of resistance welders, as shown in the accompanying illustration. For roof trusses a runaround conveyor is not used but a two truss welding fixture is used and so installed that it can be raised or lowered to facilitate spot welding of the various structural members.

the rate of 8 feet per minute, the parts are successively alkali cleaned, hot rinsed, Bonderized, cold water rinsed, and Parcolene rinsed by pressure spray application of the various solutions. Solution tanks located below the machine serve as reservoirs for the various processing solutions which are continuously circulated through the spray nozzles by pumps rated at 500 to 750 gallons per minute capacity. Heat exchangers controlled by Sarco temperature controls maintain solution temperatures at predetermined values established at definite points within the following limits: alkali cleaner, 140 to 160 deg. F.; hot water rinse, 145 to 165 deg. F.; Bonderite solution, 155 to 1[illegible] deg. F.; Parcolene rinse, 140 to 1[illegible] deg. F. Proportioning pumps are us[illegible] to add processing chemicals wh[illegible] chemical analysis indicates that su[illegible] action is necessary.

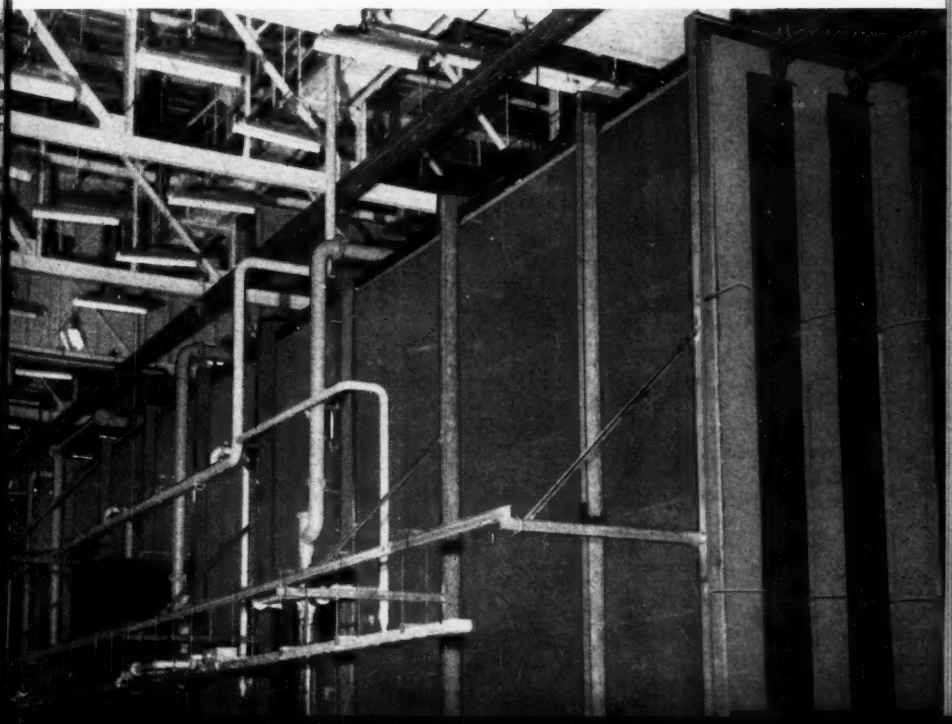
Leaving the spray phosphatizi[illegible] tunnel, the structural house sectio[illegible] enter a 52-foot long (10 feet wide) g[illegible] fired dry-off oven operated at 400 d[illegible] F. Figure 7 is a view of the dry-off [illegible] en. This step in the cycle evaporates [illegible] water trapped in crevices in the va[illegible] ous assemblies so that a complet[illegible] dry surface is obtained.

Parts leaving the dry-off oven tra[illegible] through the open air for a distance

approximately 130 feet to allow them to return to room temperature prior to entering the flow coat machine. In the 26-foot long (8 feet wide) flow coat machine, a view of which is shown in Fig. 8, parts are coated with Glidden 977 Black high temperature bake finish, which is forced through V-jet nozzles at 15 to 20 pounds per square inch pressure. The paint is not atomized and mixed with air to form a spray, as in spray painting, but is directed to the work in a smooth stream flowing through the V-jet orifices and onto the parts to be coated. The excess material drains from the parts and is recirculated through the system, first passing through a Cuno Auto-Kleen filter, and heat exchanger equipped for heating or cooling so that the coating material may be maintained automatically at a temperature of 85 to 95 deg. F. The filtered paint is conducted up four risers (one on each side of each conveyor) in the flow coat machine and then out to the coating nozzles through the manifolds (9 to each riser) in which the V-jet nozzles are mounted.

Located directly below the flow coat machine are two tanks, a 1,000-gallon tank for reducer and a 2,000-gallon tank for the black finishing material. Each one of these tanks is connected to a 5,000-gallon storage tank located below the plant floor. Reducer and black paint are automatically pumped and metered into the system from the two tanks located below the flow coat machine to maintain proper paint pressure and viscosity. The relatively large storage facilities for paint and reducer are necessary because of the rapid rate at which these materials are consumed. When operated at peak ca-

Fig. 6—A view of the twin tunnel through which welded structural members are conveyed for cleaning and phosphatizing. The various processing solutions are circulated continuously through the unit and sprayed upon the steel parts to form a protective phosphate coating.



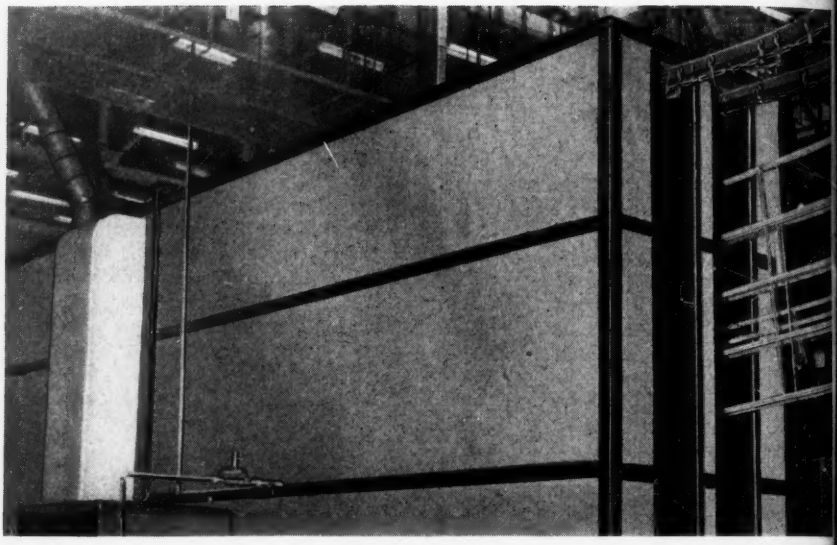


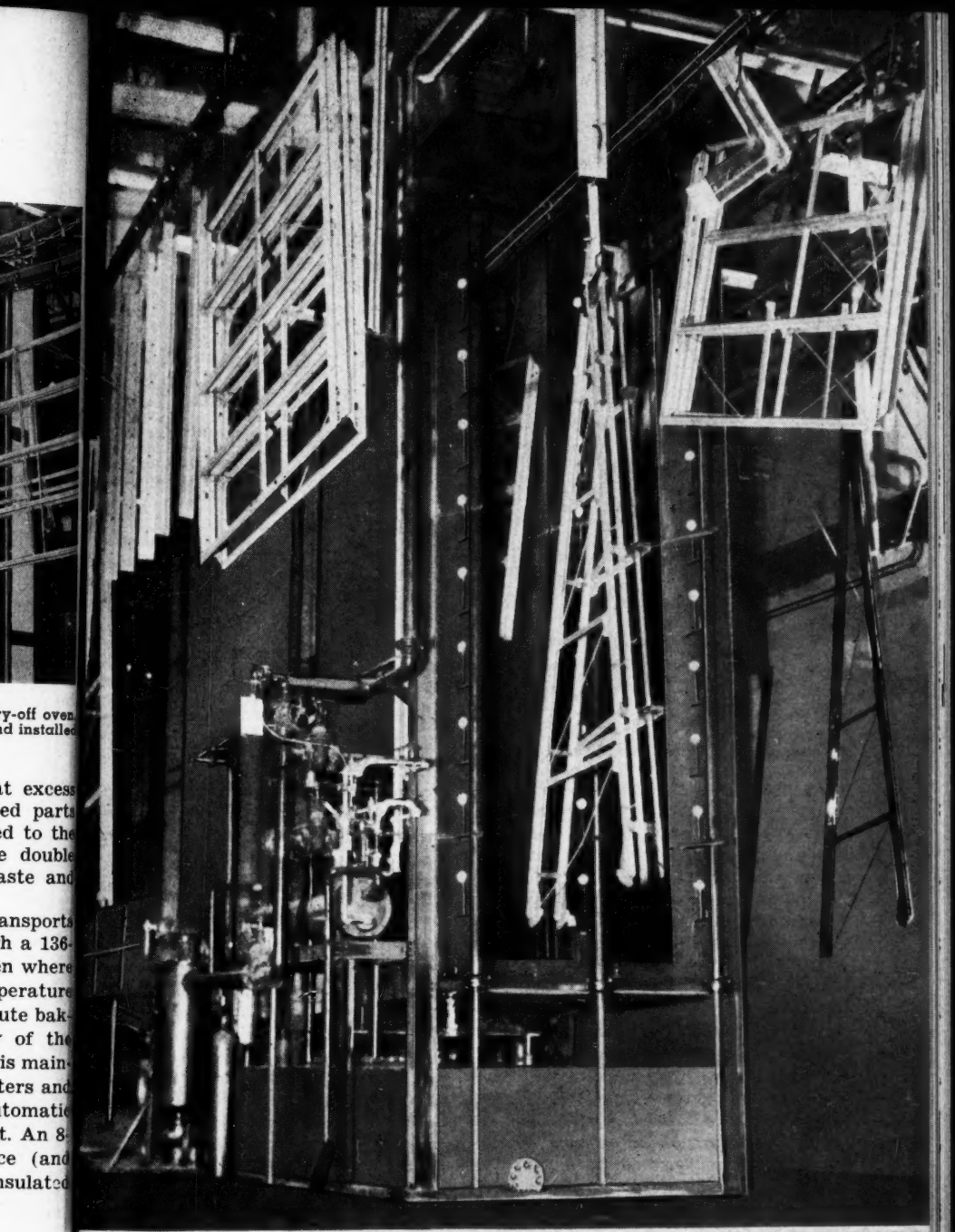
Fig. 7—This illustration shows a completed, phosphatized wall section leaving the dry-off oven. This oven, as well as the other processing units in this installation, was constructed and installed by the Spra-Con Company, Chicago, Illinois.

pacity, the flow coat machine will consume 15 gallons of black high temperature bake finish and a somewhat greater quantity of reducer every 20 minutes.

Since there is an appreciable loss of solvent or reducer by evaporation, adequate exhaust facilities had to be designed into the flow coat machine. At each end of the flow coating tunnel exhaust fans of 14,000 c.f.m. capacity are installed to remove solvent vapor and reduce the fire and health hazard. Automatic fire protection is provided by carbon dioxide gas lines located over the paint and reducer tanks and by a Grinnell fog system installed in and around the flow coat machine.

Parts leaving the flow coat machine are conveyed over a drip pan 17 feet wide by 33 feet long so that excess paint dripping off the painted parts may be collected and returned to the system. This unit serves the double function of reducing paint waste and improving shop appearance.

The overhead conveyor transports painted parts into and through a 136-foot long gas-fired U-type oven where the finish is baked on at a temperature of 450 deg. F. during a 30-minute baking period. Fig. 9 is a view of the baking oven. The temperature is maintained by six gas-fired air heaters and blowers, and controlled by automatic temperature control equipment. An 8-foot canopy over the entrance (and exit) of the huge rock wool insulated oven reduces fume spillage.



—Roof trusses and wall sections for the Lustron Home enter the world's largest flow coat booth for g. In the immediate foreground may be seen the heat exchangers fitted with Sarco temperature controls control the paint temperature. Painted parts leaving the opposite side of this unit circle over a drain area and return past the flow coat booth as indicated at the extreme right of the illustration.

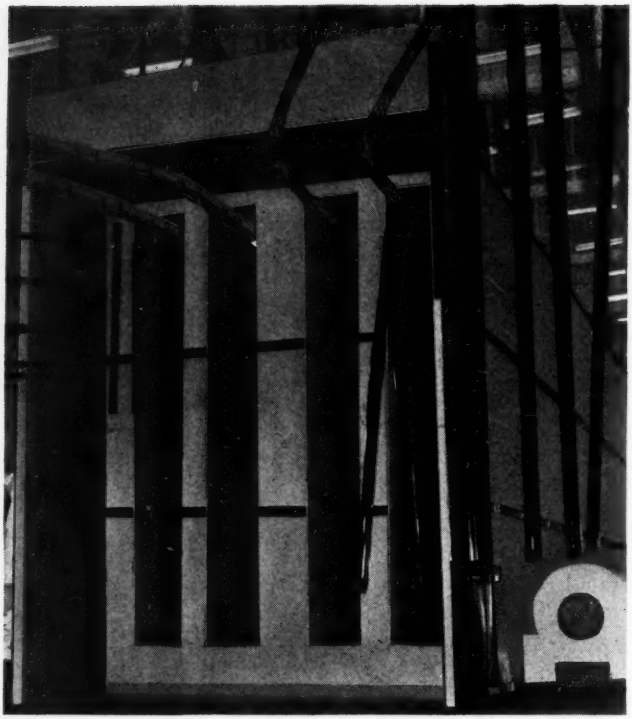


Fig. 9—A view of the 136-foot long gas-fired Spra-Con baking oven. As can be noted, parts hanging from the twin conveyors enter at the left and pass through the U-type oven, leaving it at the right, as shown in the illustration.

Painted and baked structural parts, still suspended from the processing conveyor, are transported to the storage and shipping area to join with the other completed house parts to form a complete unit, ready to be shipped to a building site and assembled into the attractive, well-engineered Lustron Home.

In U. S. Patent 2,431,417, J. H. Obey describes methods of efficiently recovering gluten from wheat and for using this material in the manufacture of various products. It may be used, for example, as a suspension to form special paints or protective coatings. As indicated in the following formula, glycerine may serve as the plasticizer:

gluten	100.0 g
sodium salicylate	10.0 g
ammonia water, 29 per cent	3.0 g
water	450 cc.
sodium ortho-phenyl-phenate	1.5 g
glycerine	12.0-30.0 g

The resulting dispersion is of medium to heavy viscosity and can be diluted with water as required. It may be applied by spraying, dipping, or brushing to form protective coatings. These water removable films are valuable as temporary masks to keep sprayed paint off selected areas. The glycerine-plasticized gluten dispersions are also useful for forming similar protective coatings on structural surfaces, to prevent them from being marred or scratched by careless treatment. The suspensions can also be cast into highly elastic films.

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(Third in a series of letters)

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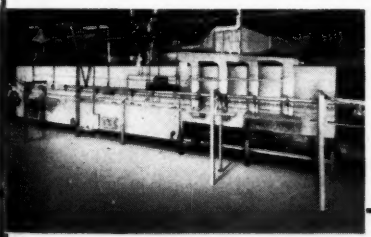

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Plating room process control IN ACTION

By LAWRENCE J. DURNEY

Assistant Superintendent, Sargent & Company

THE troubles normally encountered in plating practice may be traced to several causes, among them the following:

1. Improper cleaning procedures
2. Poor operation of the correct cleaning cycle
3. Improper processing
4. Poor solution balance

Items 1 and 3 hinge on the basic knowledge of the supervisory staff and must be determined for each particular case. Once established, however, trouble may be avoided by careful attention to items 2 and 4. Basically, the first two items mentioned then constitute an engineering problem; the second two, a control problem. It is with this control problem that the method outlined below is concerned.

A plating solution does not normally get out of balance suddenly unless contaminating materials are introduced into the solution as a result of equipment failure or unless improper additions are made to the solution in error. Rather, it is usually the result of a trend which can ordinarily be detected well in advance of the trouble which will follow failure to correct this trend.

Plating room process control, to be most useful and effective, must be of a preventive nature; therefore, a system has accordingly been set up to detect trends and forestall the potential trouble. The method involves two pertinent points; first, a systematic method of analysis, second, a complete set of easily interpreted records.

The supervisory organization concerned with finishing at Sargent & Company consists of the following individuals: (1) process engineer in charge of finishing, (2) assistant superintendent in charge of finishing, (3) foreman of the plating department. All pertinent matters of process management and control are dealt with by these three men.

Problems of processing (referred to in the first paragraph) are normally solved by consultation between the three men mentioned above. Problems of cleaning are normally solved by consultation between the assistant superintendent and foreman, with occasional assistance from or investigation by the process engineer. Operation of the cleaning cycles is the direct responsibility of the foreman. Solution control is maintained by a laboratory technician who reports to the chief inspector (Figures 1 and 2). Actual solution

maintenance is the responsibility of the foreman, and the laboratory technician forwards the solution analysis reports and recommended solution addition reports directly to the foreman for the necessary action. The action recommended by the laboratory technician may be temporarily overruled by the foreman. Such a decision, however, is subject to review by the three supervisors and the decision resulting from this review is binding.

The laboratory technician is supplied with analytical procedures for each solution to be controlled. The procedures are complete with equipment required, reagents required, method, and the necessary factors to make possible calculation of the results. In each procedure, the reagents are listed both by code number and by name. This permits operation of the procedure by non-technical personnel with only a short training period.

The technician is also supplied with a weekly testing schedule. This schedule is first set up on a strictly arbitrary basis and later adjusted to provide the proper frequency.

Since the frequency will depend on the usage of the tank, this schedule is subject to constant revision. Should the analysis show an addition requirement of less than 5 per cent of the make-up quantities, the frequency is normally revised downward. Should the requirement be in excess of 10 per cent, the frequency would be revised upward. For particularly sensitive solutions, or for particularly important constituents, these limits may be narrowed considerably.

This schedule also serves as a performance report, which is turned in to the process engineer weekly.

The results of analysis are recorded on the cumulative analytical record form, illustrated in Fig. 3. This form

Fig. 1—Chemical control of electroplating solutions begins with the collection of a representative solution sample.

Fig. 2—In the chemical laboratory the various chemical constituents of the plating solutions are determined. The Aminco-Brenner Magnegage in the foreground is used to measure nickel thickness on a routine control basis.

provides space for:

1. The tank number and description
2. The make-up requirements of the solution
3. The control limits to be maintained
4. A tank factor to permit easy calculation of additional requirements
5. A cumulative record of analyses, additions, and other action taken

This sheet is consistently checked for indications of undesirable trends. Discussion of data contained in this report in conference with the supervisor and foreman results in the determination of the proper method of correction.

After the various plating solutions have been analyzed, a solution addition

BRASS MACHINE #1

TANK #6 CAPACITY: 260 gal. SOLUTION: Brass

CUMULATIVE ANALYTICAL RECORD

MAKE-UP

Copper Cyanide	4.0	oz. per gal.	65	lbs.
Zinc Cyanide	1.25	oz. per gal.	20	lbs.
Sodium Cyanide	7.5	oz. per gal.	120	lbs.
Sodium Carbonate	4.0	oz. per gal.	65	lbs.

MAINTENANCE LIMITS

Copper	2.8	to	
Zinc	0.7	to	
Cu/Zn Ratio	4/1	to	
Free Cyanide	2.0	to	
Sodium Carbonate	4.0	to	12.0

NOTES

TANK FACTOR: 16.3 x oz./gal. to be added = lbs. to be added

DATE	ANALYSIS				ADDITIONS	NOTES
	Free NaCN	Cu	Zn	R		
12/2/48	1.94	3.18	0.87	3.66	5# NaCN	
12/28/48	2.03	2.03	0.81	3.91		

Fig. 3—Analytical Record Sheet used for solution analysis and control

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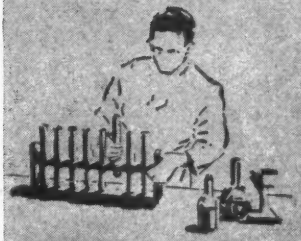

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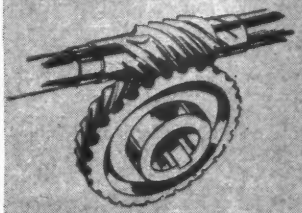

ECONOMICAL: because it cleans efficiently, lasts long and sells at regular "trichlor" prices.

Form 14-22A

SOLUTION ADDITION FORM

Serial No. 49-1

Date 1/14/49

Time 10:30

To Department 22 Foreman:

Analysis shows that the following tanks are in need of balancing:

Tank No.	Solution	ADDITIONS REQUIRED Material	Quantity	Other Treatments Recommended
1	MacDermid Copper	NaCN	7#	
1	Du Pont Copper	NaCN	5#	

By E. M. D.

The above outlined recommendations have been completely carried out.

Date

Foreman

Time

Fig. 4—Solution Addition Form (partially completed) which is submitted by the laboratory technician to the plating foreman for action

DAILY NICKEL TANK RECORD — TANK No. ....

UDYLITE NICKEL

DATE	A. M.				P. M.				
	Time	Temp.	pH	Brightener Add'ns or ph Adjustments	Time	Temp.	pH	Surface Tension Reading	Brightener Add'ns or ph Adjustments
11/16/48	10:00	136	4.05		3:00	134	4.15		
11/17/48	10:00	134	4.10		3:00	134	4.10		

Fig. 5—Partially completed record sheet used for bright nickel solutions

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HOURLY NICKEL THICKNESS RECORD

Date	Time	Tank No.	Voltage	Plating Time	Part No.	Part Name	Notes

Fig. 6—Sheet used to record hourly thickness measurements of nickel plated parts

form, similar to that illustrated in Fig. 4, is filled out by the laboratory technician and submitted to the plating foreman for action.

For solutions with critical variables, such as bright nickel solutions where pH and temperature are critical, daily check sheets are provided for control of these variables. A sample sheet for a bright nickel solution is illustrated in Fig. 5.

Quality control is maintained by regular magnetic thickness checks recorded on the form illustrated in Fig. 6.

Material control is maintained by a monthly recapitulation of the various record sheets, recorded on suitable forms.

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Paint Booth Coatings
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943 East Niagara Street Tonawanda, N. Y.

Manufacturers of SILICON CARBIDE *and* ALUMINUM OXIDE ABRASIVES

Processing of Titanium Enamel Direct to Titanium Steel

By JOHN L. LANNAN

Westinghouse Electric Corporation

OUR experience in applying titanium enamel direct to titanium steel goes back to late 1946 when the process was discussed and studied. As usual, the original tests were made on sample plates and from the results of these it was decided to attempt a small run on the range platforms or heater tops. This piece was selected because it seemed to be readily adapted to the process, requiring no design changes, and was free from welding other than spot welds. Also, because of the use of the part on the range, thin application weights, surface hardness, and acid resistance were required.

The first run was made on a production piece in May 1947. Only thirty pieces were enameled. These were put through the paces of the quality control laboratory and came out with flying colors, showing the process to be practical.

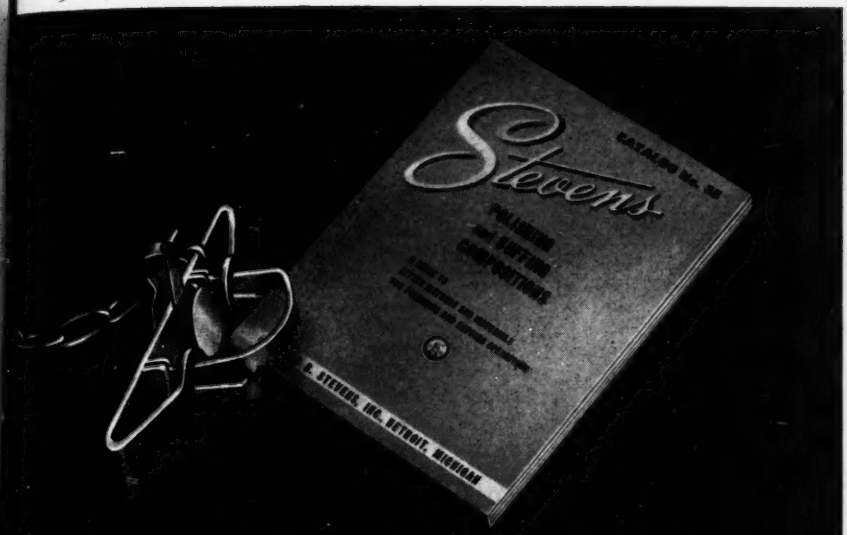
However, the test did not end there. The next step was to process one hundred platforms, assemble them to ranges, and follow the ranges in actual home use. This run was made in September 1947, and the ranges sent out on test. A check on the ranges in the homes in February 1948 showed that no trouble was being experienced with the platforms and the titanium enamel on the titanium steel seemed to be holding up even better than platforms enameled in the conventional manner.

In our plant we schedule range parts through the continuous pickle and continuous furnaces in sets. This requires that the platform must be fired along with other parts of the range. Early samples indicated that the titanium enamel then available required 40 to 50 degrees more fire when applied directly to the steel than the normal white over ground coat. So as not to interfere with production the first two sample runs of platforms were made on week ends.

These sample runs indicated that several things were still necessary before production could start. First a nickel tank and filtering equipment had to be installed in the continuous pickle setup. The titanium enamel had to be softened so that it would fire down along with the other ware, and shop techniques had to be worked out.

By February 5, 1948, the pickle was ready and an enamel available and production was started on the platform applying the enamel directly to the

A paper presented to the 10th Annual Forum of the Porcelain Enamel Institute



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METAL FINISHING EQUIPMENT AND SUPPLIES DIVISION

FREDERIC B. STEVENS OF CANADA, LTD. WINDSOR, TORONTO, ONTARIO

steel surface.

At first, anticipating trouble, and so that normal production would not be retarded, only one sprayer was started on the process. From this other sprayers were gradually worked into the process. The production has grown from nothing the first day to a point where now all range platforms are being processed by applying titanium enamel directly to titanium steel.

Fabrication

In general, titanium steel may be fabricated into parts as readily as regular enameling steel. On the platform it has not been necessary to change any of the dies or press shop procedure to fabricate this piece. Dies, however, should be kept in top condition to avoid scratches.

The only part of fabrication that must be controlled on this part is welding. Ordinary spot welds are satisfactory for enameling and have given no trouble.

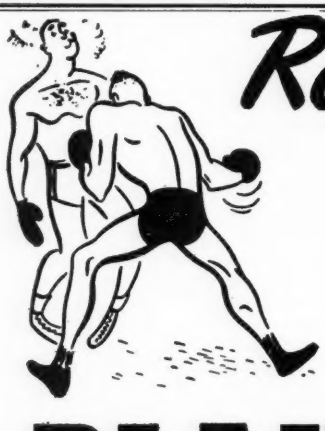
In gas welding a strip of the parent metal should be used if a filler is required. If ordinary filler rods are used pop-off will occur after the enameling process. Gas welds that do not require a filler have been found to enamel satisfactorily. Of course weld scale removal applies to this steel the same as to enameling steel.

Sample plates have been run to test arc welding. Although these tests have been very limited, the Heli-Arc process has been found satisfactory without the use of a filler rod and by using parent metal as a filler.

Enameling Procedure

The enameling procedure in general consists of pickling, inspection, spraying in individual booths, drying, firing, application of switch markings by screen process and refiring.

It seems that titanium enamel ap-



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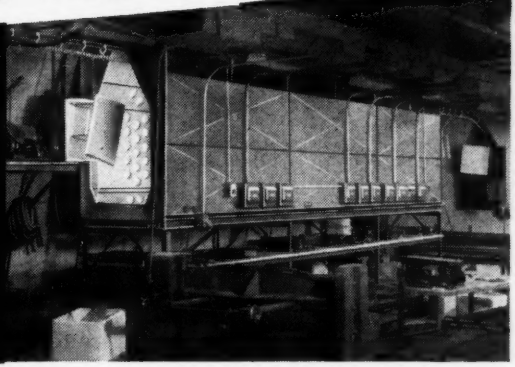

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Marvel chose Jensen for this critical job because Jensen "nested" lamps assure *even* color *over all,* eliminate reject hazards, produce a hard finish that stands up under gruelling trailer-coach conditions.

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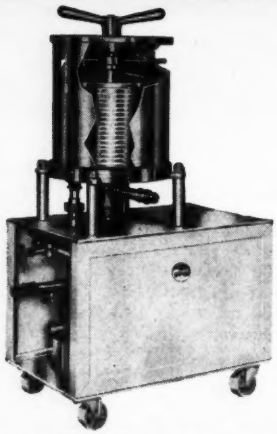

★ The Ertel Disk Filter will accomodate any number of filter sheets up to its rated capacity without danger of bypassing unfiltered liquid. Designed for plating solutions such as copper, chrome, nickel, tin, etc. Filter rings, as well as entire filter, are rigidly constructed for long life. Reloading or cleaning consumes but a few minutes time. Standard portable unit is furnished in stainless steel unless otherwise specified.

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plied directly to the steel is very sensitive to dirt and impurities on the steel when the piece is sprayed. Therefore, a rack was designed to hold the piece in transportation from pickle to the spray booth so that the smallest area possible was subject to rubbing on the rack. This was done because it was felt that impurities rubbed on the steel from the wooden racks caused a grayish-pink discoloration of the enamel.

Immediately before spraying the top surface of the platform is wiped off with a clean dry cloth to remove any shop dirt or other impurities or any smudge from the pickling process. The piece is also inspected for dings and scratches as these show up later as plainly as on a painted surface. A scratch may be sanded out or a ding removed at this point.

At present in spraying a DeVilbiss 765 air cap with "E" tip and needle on an MBC gun is in use. It is felt that this combination furnishes better atomization and a smoother finish than other gun assemblies tried; although a "D" tip and needle with a 64 air cap can be used. Care must be taken to avoid lumps on the piece during the spraying operation. This is brought out because titanium enamel over steel does not flow as readily in the fire as over ground coat and even a very small lump will stand out on the finished piece. To hold this defect to a minimum a grating has been installed in the spray booth to replace the conventional solid bottom. This reduces enamel dust in the booth and permits the overspray that normally settles in the bottom of the booth to fall through to a collecting pan. Incidentally this also makes the booth easier to clean. A spray weight of 30 grams per square foot (one side) is maintained. While a lighter weight of application is sufficient to give satisfactory coverage, it was found that lighter weights do not smooth over in firing under pres-

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Supersheen

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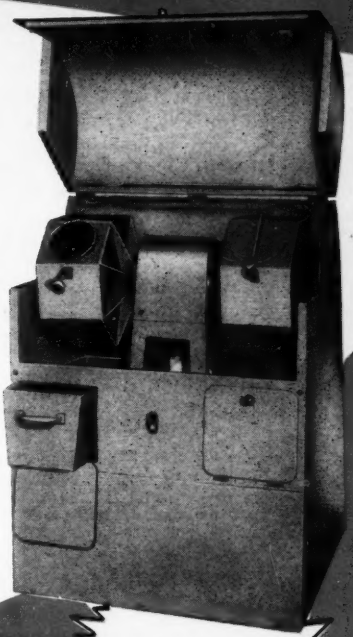

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The **SUPERSHEEN** Process can be applied to produce the *precise* result in a *wider* range of work—from *last* deburring to the *gentle* honing of stampings, castings, forgings and machined parts . . . even where micro tolerances are a must! The "before and after" photo at left is unretouched.

ALMCO Supersheen

DIVISION OF QUEEN STOVE WORKS, INC.

Factory and General Offices: Albert Lea, Minn.

ent conditions and leave a rough surface.

Drying of the piece is accomplished in the conventional manner and no troubles have yet been encountered or traced to this part of the process.

Handling of the bisque piece must be done with more care than with the conventional ware. The piece should only be handled on the back side. The titanium enamel now in use has very low bisque strength when applied directly on the steel and all attempts so far to strengthen it have resulted in discoloration of the enamel. The enamel also seems to discolor more readily from perspiration and dirty gloves than do the zirconium enamels.

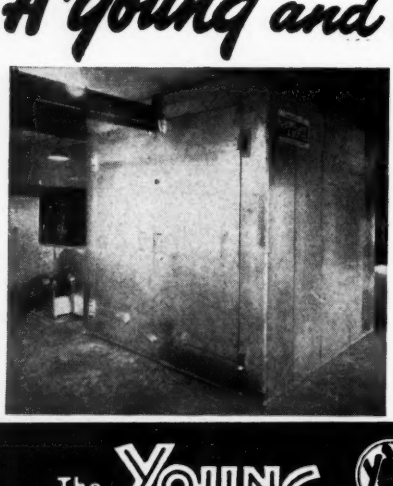
As can be readily understood there is no rimming or edging done on the titanium steel since this would leave bare steel which is subject to rusting the same as any other steel.

The titanium enamel now in use is rather difficult to smooth down when run directly on the steel and along with other ware processed in the conventional manner. At present it is being fired at 1530° for four minutes. This fire is rather severe for the other ware using ground coat covered with zirconium enamel but is not quite enough for the titanium process. At present the rough condition encountered is overcome by refiring at the same time and temperature after silk screening. Enamels smoothing down at a lower temperature are a must if the process is to find general use so that only one fire is required for proper maturing of the enamel. Just recently the enamel suppliers have developed frits that show much promise in smoothing down on one firing and these frits are now being tested for production use.

Rejects and Causes

As with any new process rejects are encountered and must be overcome

A Young and Bertke OVEN



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CHEMICAL USERS' GUIDE To General Chemical Products for the Metal Industries

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTHS	SHIPPING CONTAINERS	APPLICATIONS
Sulfuric Acid H_2SO_4	Liquid	66° Be° (93.19%) 99% Oleum, 20-65%	Carboys (except Oleum) Steel Drums Tank Trucks Tank Transports Tank Cars	Pickling and descaling; electroplating; bright dipping; electrolytic polishing; galvanizing; anodizing.
Hydrochloric Acid HCl + water *(Muriatic Acid)*	Liquid	18° Be° (27.92%) 20° Be° (31.45%)	Carboys Tank Trucks Tank Cars	Pickling; electroplating; bright dipping; galvanizing; tinning; etching metals; dissolving metals.
Nitric Acid HNO_3 + water	Liquid	36° Be° (52.30%) 38° Be° (56.52%) 40° Be° (61.38%) 42° Be° (67.18%) 95%	Carboys (except 95%) Drums Tank Cars	Pickling; electroplating; bright dipping; oxide finishing; dissolving and stripping metals.
Hydrofluoric Acid HF + water	Liquid	30% 60% 48% 70% 52% 80%	Rubber Drums (except 60%) Steel Drums & Tank Cars (60% only)	Pickling; electroplating; electrolytic polishing; bright dipping.
Sodium Fluoride NaF	White Powder	90 or 95% Light or Dense	Fibre Drums	Manufacture of rimmed steel; heat treating; galvanizing; pickling; electroplating.
Sodium Bifluoride $NaHF_2$	White Powder	90%	Fibre Drums	Electroplating.
Trisodium Phosphate $Na_3PO_4 \cdot 12H_2O$ *(TSP)*	Crystal	P_2O_5—18.4%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Sodium Metasilicate $Na_2SiO_3 \cdot 5H_2O$	White Granules	98.5%	Multiwall Paper Bags Fibre Drums	Alkali cleaning.
Oxalic Acid $C_2H_2O_4 \cdot 2H_2O$	Colorless Crystals	99.5%	Fibre Drums	Oxide finishing; metal cleaning.
Potassium Fluoborate KBF_4	White Powder	97.0%	Fibre Drums	Aluminum and magnesium casting; as a flux and grain refiner for aluminum; for removing magnesium from secondary aluminum alloys.
Sodium Fluoborate $NaBF_4$	White Powder	94.0%	Fibre Drums	
Ammonium Fluoborate NH_4BF_4	White Powder	96.0%	Fibre Drums	Aluminum and magnesium casting; electroplating.
Fluoboric Acid HBF_4 + water	Liquid	42.0%	Rubber Drums	Electroplating; metal cleaning or dipping.
Lead Fluoborate $Pb(BF_4)_2$ + water	Liquid	51.0%	Carboys	Electroplating.
Tin Fluoborate $Sn(BF_4)_2$ + water	Liquid	46.0%	Rubber Drums	Electroplating.
Zinc Fluoborate $Zn(BF_4)_2$ + water	Liquid	49.0%	Rubber Drums	Electroplating; bonderizing aluminum.
Copper Fluoborate $Cu(BF_4)_2$ + water	Liquid	44.0%	Carboys	Electroplating.

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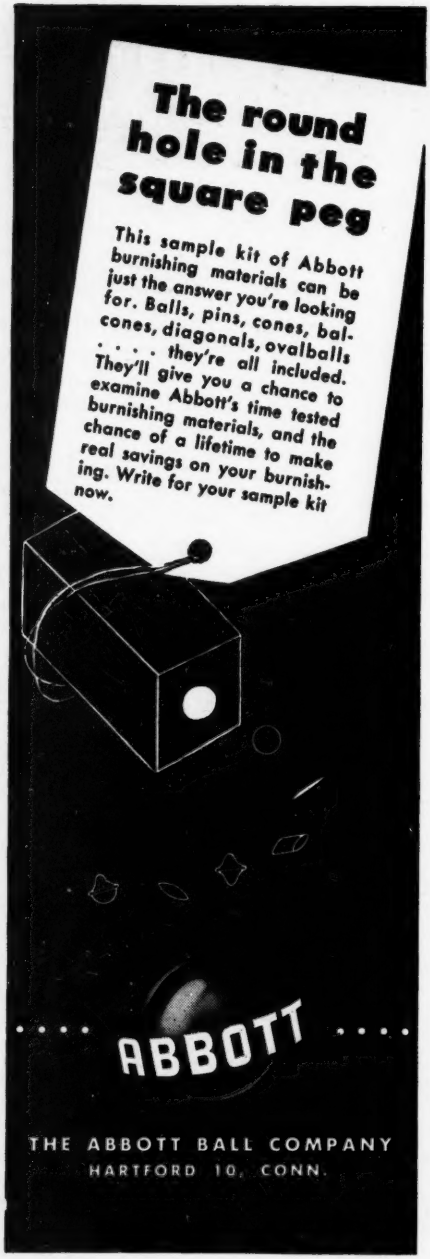
The round hole in the square peg
This sample kit of Abbott burnishing materials can be just the answer you're looking for. Balls, pins, cones, balcones, diagonals, ovalballs . . . . they're all included. They'll give you a chance to examine Abbott's time tested burnishing materials, and the chance of a lifetime to make real savings on your burnishing. Write for your sample kit now.
ABBOTT
THE ABBOTT BALL COMPANY
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The percentage of rejects at present is higher than it should be but much improvement has been made since the start of the project and progress is continuing. Due to the color stability of the enamels on refiring, the reworking of rejects is somewhat simplified. In general it is not necessary to respray the entire piece but only to spot spray or touch up the area of the reject in order to cover it on refiring. The color, however, will start to change after three refirings but only in extreme cases are three refires necessary. Then the entire piece must be resprayed.

Boil has been one of the principal causes of rejects. The boiling encountered is of two kinds. That which comes from underfiring, and that which comes from improper cleaning or wiping of the piece before spraying. Titanium steels are supposed to be non-boiling steels and to date this has held true. Most of the boil rejects can be repaired by simply refiring, although in some cases it is good to dust a little enamel over them so there is a little more glass to flow over on refiring.

Orange peel or rough finish has been a source of trouble. As has been stated before, the real correction for this trouble is an enamel which will flow a little more readily on firing. The orange peel encountered is not the same as experienced over a ground coat piece but is more of a fine pebble structure similar to that encountered in paints. Refiring the piece will generally smooth it out.

Steel lines have been encountered. This defect seems to be caused by some impurity in the steel and causes the enamel to raise in a straight line across the piece. If these are encountered there are always several on one piece. The defect appears very similar to a deeply scratched piece of steel which has been run in ground coat. Sometimes they can be healed over

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The complete system includes:

- POWER SPRAY METAL PREPARATION UNIT
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satisfactorily by reversing the hang of the piece on the furnace chain and refiring. Pieces with severe lines are sandblasted and rerun with ground coat. This will correct most of the lines but is not a sure cure. The steel supplier has made great improvement in recent months which has cut in half the rejects due to steel lines and is working to eliminate the difficulty.

A peculiar type of rejects which occurred in the early days of the project is what was called "pink lines." This is a pinkish discoloration of the enamel on the edges of the piece or as a streak from a hole in the piece. It was traced to excess deposition of neutralizer or drain streaks of neutralizer. This has been eliminated by changing to a weak borax neutralizer and by installing an air jet just below the surface of the neutralizer at the exit end of the continuous pickle. The purpose of the air jet is to keep any froth that might form on the neutralizer surface away from the ware coming from the tank. Originally the pink lines were a real source of trouble but are now seldom encountered.

Another difficulty encountered is a pinkish-gray spot looking somewhat like a small water mark. This has been traced to spots of oil coming through the air lines and has been eliminated. It can also be caused by too much oil on a spray gun.

Warpage and its partner hairlining seem to be out of the picture on the platforms with titanium steel. So far all the platforms have been run of .058-inch steel. Recent tests indicate that .050-inch stock is satisfactory.

Reject platforms that are beyond repair are salvaged by sandblasting and rerunning in ground coat. If repickled the sandblasted surface seems to pick up too much nickel and leaves a rough pitted surface if the white is applied directly to the steel. Some experimental work has been done on applying

Production

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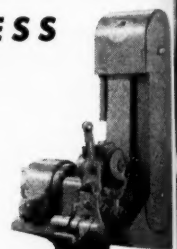
POLISHER
BUFFER
SURFACER



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Roto-Finish Limited, London, England
A. Flavell Pty. Ltd., Melbourne, Australia
Frederic B. Stevens of Canada Limited., Windsor, Canada

THE STURGIS PRODUCTS CO.
428 Jacob Street, Sturgis, Michigan

the white directly to the sandblasted piece and this procedure does not seem to decrease the bond of enamel but as yet the evidence is not conclusive.

Properties of the Processed Piece

The measurement of adherence of titanium enamel to titanium steel is a debatable question. So far it has not been practical to compare the adherence of enamel applied directly to steel with the adherence of a ground coat. Apparently a different type of adherence is encountered and, therefore, should be measured in a different manner. For this purpose a torsion test has been used which measures the degree of twist a standard test panel may be given before crazing the enamel. For want of a better comparison, a normally processed white over ground coat piece will stand about 45 deg. twist on this test while a piece processed with titanium will stand 95 degrees. The comparable enamel thickness in this case being .015 inch for the normally processed piece and .005 inch for the titanium piece with the steel thickness remaining the same.

Correlation of data between the amount of nickel deposited on the piece in the pickling process and adherence shows that the amount of nickel on the piece is very important for good adherence. The best results are obtained with a nickel deposit of .08 to .12 gm./sq. ft. of surface.

Scratch resistance of the titanium enamel is about 50 per cent greater than that of zirconium enamels. On testing with a diamond point and measuring the weight required to produce a scratch visible from two feet, zirconium enamels will scratch at 900 to 1200 gram-inches while the titanium enamel will stand 1500 to 1800 gram-inches.

Of particular interest at this time is the great resistance to chippage given to pieces enameled by this process. Very, very few pieces are rejected at

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PIONEERS IN PROTECTION
M&W Co. 1876
. . . where industry goes with finishing problems

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the assembly lines for chippage. Field complaints of chipped platforms have practically dropped out of the picture. When chippage is encountered from a hard blow it is to be noted that the enamel is crushed from the piece rather than flying off a large area as encountered with a normally processed piece. All this adds up to lower transportation losses and savings in packing and crating materials.

Summary

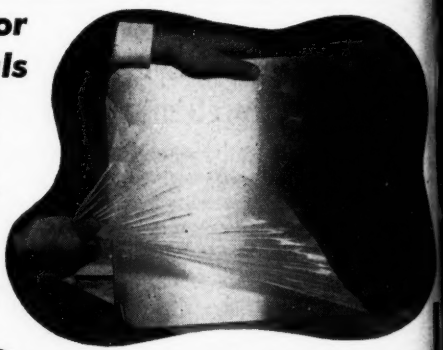
Besides the range platform other kinds of parts have been fabricated of titanium steel for experimental runs. Table tops for water heaters requiring four gas welds at the corners have been successfully enameled. Unit constructed range bodies, requiring both gas and spot welding, have been enameled successfully and are now on test in the field. Food liners have been enameled resulting in elimination of warpage problems.

The great advantage of the process of applying titanium enamel directly to titanium steel lies in the thinner coat of glass required to give the desired coverage. With thinner weights of application the industry can place a product which is more resistant to chippage into the field. Also, warpage is overcome and lighter gages of steel can be used. It is easy to see that as this process grows the old familiar ground coat will go out of the picture with the future possibility that the enameler can double his plant capacity with existing enameling equipment.

Ruthenium is used to harden palladium especially in jewelery alloys in the ratio of about 5 per cent ruthenium and 95 per cent palladium. Fountain pen points utilize the high resistance to wear and corrosion of this element for smooth writing and long life.

A Strippable Plastic for the Protection of Metals

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust.



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STRIPLASTIC

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Our engineers will be pleased to consult with you in the solution of your problem

Schmieg INDUSTRIES INC.

Engineers & Manufacturers

Finishing Clinic

In this department are presented some of the questions submitt by readers together with suggested solutions of the proble outlined.

Question. *We are finishing some of our wood products with nitro-cellulose lacquers and as a subsequent operation we are employing a pneumatic rubbing machine to secure with the aid of an oil base rubbing compound a finish which is known as a "rubbed finish." We should like to speed up this operation by using a conveyor and would appreciate your comments upon such a method.* *J.E.D.*

Answer. A process somewhat similar to the one you described is used in the finishing of metal products for the same purpose; namely, rubbing down the baked lacquer to obtain a glossy finish. This operation is performed with the aid of discs of a particular kind of carpeting. The final operation in the process is performed with a similar machine using sheepskin discs (woolen).

It is our thought that for your process, since the articles you wish to rub are perfectly flat and straight, you could employ a narrow endless c conveyor belt upon which could fastened cleats so spaced that a n ber of your T-square blades coul placed flat on the conveyor. This veyor could then convey the blades derneath a series of roller sh buffs rotating in a direction opp to that of the conveyor travel, and rubbing process could be accompli by the power-driven roller sh buffs.

Answer. It is also possible that stead of roller-type buffers you c use the disc type, with the discs tating in the same plane as the face of the belt. Woolen sheep discs would be good for the final cle ing up.

Another thought occurs to me t might bear investigation. I know one instance where small lacque wood objects are given the appeara of rubbing by immersing them f few moments in the vapors of lacq

lvents. A vapor-type degreaser is ed, with heavy solvent vapors be- een the surface of the liquid and e cooling coils around the top of the nk. Immersing the lacquered objects fter they are dry) in these vapors r a few minutes resoftens the lac- er and flows it out to a perfectly ooth, flawless finish. Upon removal ey are allowed to dry hard again.

A final thought is that perhaps you uld design a machine to rub both es of the blades at once. You would ed a pair of soft rubber or composi- n feed rolls to grip and hold the rk. These rolls would revolve very wly. Just behind these two rolls uld be two rubbing rolls revolving high speed, which would buff the face as the blades are carried be- een them by the feed rolls. R.H.W.

— fc —

Question. *The problem with which are confronted is the removing of poli from the surface and crevices decorative moulding sections. From samples submitted you will be able note the character of the material d the condition which we have to ercome. The mouldings are made in foot lengths. We desire to accom- sh the cleaning operation as eco- mically as possible.* *C.E.L.*

Answer. After examining the sam- s which you forwarded and consid- g the subject carefully, I am con- ced that your problem can be solved chanically with the aid of a clean- compound or a combination of aning compounds.

From a mechanical standpoint, I be- e the problem can be solved ough the use of a tunnel-type spray sher or a washer used in conjunc- n with rotating brushes to remove tripoli mechanically.

From a chemical standpoint, the tri- i can be removed by an alkaline solution used in a spray washer and followed by a hot water rinse, or if that is not adequate for the particular variety of tripoli used in your plant, an emulsion-type cleaner could be used prior to the pressure spray. In considering the rotating brush clean- ing arrangement, the emulsion cleaner would probably not be needed since the mild alkaline cleaner used in connec- tion with the brushes would be suf- ficient. The usual hot water rinse would follow.

These comments merely outline the method or methods which I think would solve your problem in the most satisfactory fashion. For more specific information and actual assistance in the solution of your problem, I should like to refer you to the following man- ufacturers who can advise you about mechanical equipment and the chemi- cal solutions to be used in conjunction with it: (names and addresses of man- ufacturers furnished).

— fc —

Question. *Please let me know if there is any device made to control the flow of water into rinse tanks so that the surface of the water may be kept clear and clean, and the total volume of water used may be reduced.* *S. W.*

Answer. One very simple device to control the flow of water into rinse tanks could be constructed with a valve to which is connected a float. As the water flows from the rinse tank and the level is lowered, the float would fall and the valve would open. This could be adjusted to any prede- termined rate of flow. For further in- formation on rinse tank design, you might be interested in reading the article "Pointers in Rinse Tank De- sign" reviewed by Dr. Allen G. Gray in the August 1948 issue of PROD- UCTS FINISHING, p. 84.

1949 CONFERENCE

National Association of Corrosion Engineers

NETHERLAND PLAZA HOTEL, CINCINNATI, OHIO
APRIL 11, 12, 13, AND 14

Dr. N. E. Berry, chairman of the technical program committee, in welcoming N A C E members and guests to the 5th Annual Conference and Exhibition of the Association, has announced that the technical program will feature eleven symposia on aspects of corrosion affecting various industrial groups. The Exhibition will include displays of methods, materials, equipment and services for combating corrosion.

Tentative Program

Monday, April 11

SYMPOSIUM ON CORROSION PRINCIPLES

2:00 P. M. "Why Metals Corrode" by H. H. Uhlig, Massachusetts Institute of Technology, Cambridge, Mass.

3:00 P. M. "The High Temperature Corrosion of Metals" by Hugh J. McDonald, Loyola University, Chicago, Ill.

4:00 P. M. General Business Session.

Tuesday, April 12

CHEMICAL INDUSTRY SYMPOSIUM

9:00 A.M. "The Pulse Polarizer in Corrosion Technology" by Glenn A. Marsh, The Pure Oil Co., Northfield, Ill., and Hugh J. McDonald, Loyola University, Chicago, Ill.

9:40 A.M. "Physical and Corrosion Characteristics of Lead in the Chemical Industry" by Kempton H. Roll, Lead Industries Association, New York.

10:20 A.M. "Corrosion Tests in the Processing of Soap and Fatty Acids" by W. Z. Friend, International Nickel Co., New York.

11:00 A.M. "Plant Corrosion in the Fatty Acid Industry" by R. J. Paul, Emery Industries, Inc., Cincinnati, Ohio.

ELECTRICAL AND COMMUNICATIONS INDUSTRIES SYMPOSIUM

9:00 A.M. "Corrosion Protection of Power Transformers by Flow Coat Method" by Seibert L. Miller, Union Electric Company of Missouri, St. Louis, Mo.

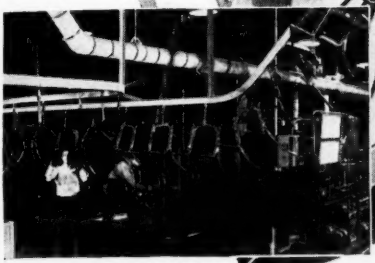
9:40 A.M. "Corrosion Testing of Buried Cables" by T. J. Maitland, American Telephone and Telegraph Co., New York.

10:20 A.M. "Field Experience with Corrosion Protection of Galvanized Substation Structures" by Seibert L. Miller, Union Electric Company of Missouri, St. Louis, Mo.

11:00 A.M. "Use of Dry Disc Rectifiers as Valves in Electrolysis Drainage Return Wire" by W. D. Connon, Bell Telephone Company of Pennsylvania, Philadelphia, Pa.

How many Chair Frames in an Hour?

180 beautiful nickel-chrome plated chairs—an average of 1 every 20 seconds!—are turned out by the Udylite Automatic Plating Machine in use at American Fixture and Manufacturing Company.



● Work goes in as raw tubular steel, comes out flawlessly nickel-chrome plated. The Udylite "Fully Automatic" double-row machine shown above performs the cleaning, nickel-plating, and final chrome-plating in continuous production, without re-racking.

Two S-frame chairs are mounted on each rack, with 2 racks per carrier. Work carriers move at a rate of 45 per hour, turning out 180 S-frame chairs per hour, or 720 hairpin legs per hour. Production of single legs is 1,440 per hour.

Here is the answer to *your* quest for greater output, lower manufacturing costs, and better utilization of manpower. Write today for further information—describe your product and process—and we will promptly supply detailed recommendations, without cost or obligation to you. *The Udylite Corporation, Detroit 11, Michigan.*

PIONEER OF A *BETTER* WAY IN PLATING

THE Udylite CORPORATION

TESTED SOLUTIONS • TAILORED EQUIPMENT • AUTOMATIC CONTROL IN METAL FINISHING

Wednesday, April 13

CATHODIC PROTECTION SYMPOSIUM

9:00 A.M. "Electrolysis Experiences on a 115-KV High Pressure Oil-Filled Pipe Type Cable Installation in New Orleans" by S. E. Trouard, New Orleans Public Service, New Orleans, La.

9:40 A.M. "Engineering Aspects of Cathodic Protection as Applied to Pipe Lines" by E. P. Doremus, Cathodic Protection Service, Houston, Texas.

10:20 A.M. "Cathodic Protection Distribution in Zinc-Steel Systems" by T. P. May and George S. Gordon, International Nickel Co., New York.

11:00 A.M. "Corrosion Products of Zinc Anodes" by E. A. Anderson, New Jersey Zinc Co., Palmerton, Pa.

PULP AND PAPER INDUSTRY SYMPOSIUM

9:00 A.M. "Major Corrosion Problems in the Pulp and Paper Industry" by Roy Whitney, Institute of Paper Chemistry, Appleton, Wis.

9:40 A.M. Round Table Discussion, led by H. O. Teeple, International Nickel Co., New York.

10:20 A.M. "Corrosion of Digesters and Related Equipment" (author not specified), A. O. Smith Corp., Milwaukee, Wis.

11:00 A.M. "Non-Metallic Materials and Relation to Pulp and Paper Mill Corrosion Problems" by Carl Richter, Stebbins Engineering and Manufacturing Co., Watertown, N. Y.

GENERAL INDUSTRY SYMPOSIUM

2:00 P. M. "Field and Laboratory Evaluation of Petroleum-Base Rust-Preventives" by E. L. Walters and R. G. Larsen, Shell Development Co., Emeryville, Calif.

2:40 P. M. "Erosion—Corrosion of Metals and Alloys" by W. A. Luce and M. G. Fontana, Ohio State University, Columbus, Ohio.

3:20 P. M. "Potential Relationships Between Zinc and Iron in Various Natural Waters" by R. B. Hoxeng, Case Institute of Technology, Cleveland, Ohio.

4:00 P. M. "Corrosion Characteristics of Titanium" by C. H. Permer, Du Pont de Nemours & Co., Inc., Wilmington, Del., and G. E. Hutchinson, Remington Arms Co., Bridgeport, Conn.

TRANSPORTATION INDUSTRY SYMPOSIUM

2:00 P. M. "Corrosion Aspects of Fusion Welding Aircraft High Strength Aluminum Alloys" by L. W. Smith, Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y.

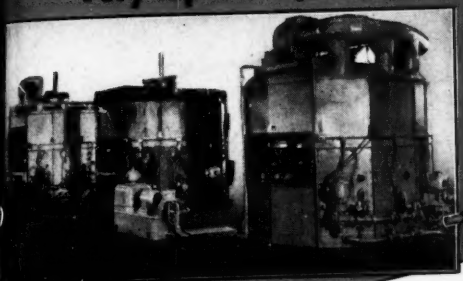
2:40 P. M. "Application of Corrosion-Resisting Materials to Railway Electrical Contruction" by H. F. Brown, New York, New Haven and Hartford Railroad, New Haven, Conn.

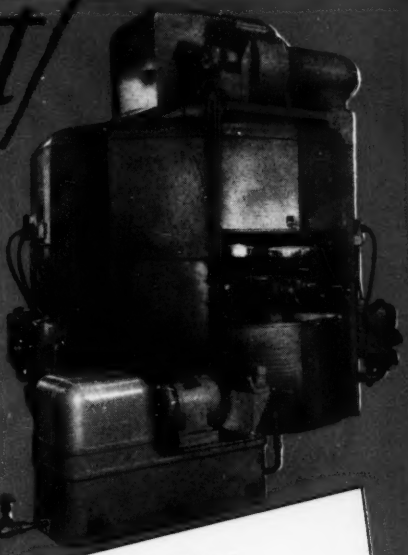
3:20 P. M. "Electrolytic Corrosion of Steel in Concrete" by G. M. Magee, American Association of Railroads, Chicago, Ill.

4:00 P. M. "Corrosion of Automobile Bodies" by W. R. Wiers, Fisher Body Division of General Motors Corp., Detroit, Mich.

Achievement!

A Very Special Parts Washer for a Very Special purpose





The Problem

A machine is required which can be used for two operations on television bulbs.

(A) Cleaning the inside of bulbs in such a manner as to be satisfactory for the application of fluorescent screens.

(B) Removing defective coating from the inside of bulbs which are to be reclaimed for the same purpose as in (A).

Machine will be capable of producing_____ clean bulbs per hour on bulbs up to_____diameter or_____bulbs per hour on bulbs up to _____diameter. (Loaded on alternate heads)

Machines consist of twelve hood rotating and indexing mechanism, having certain dimensions between head center and minimum flange at right angles for the direction of travel.

Adequate safety devices will be supplied to prevent damage or injury to the work, the machine and/or the operator, and all normal controls shall be so located on one panel as to be readily available from the normal operating station.

Considering the additional fact that the unit was to physically withstand highly corrosive liquids and fumes with normal maintenance and would not introduce contaminating substances in the process of cleaning, the following design was developed—

The Solution

A dodecagonally shaped enclosure with drawer type pans and tanks with all equipment mounted on the outside for safety and ready maintenance.

A fully protected, Geneva type, hydraulically operated, spider shaped turn table with toggle type holding fixtures.

Cam interlocked, no load, no spray devices operated from the holding fixtures. Entire interior of hood and exhaust systems smooth and easy to clean—properly coated with an alkali-acid resistant coating and covered with Latex rubber.

Entire unit not alone constructed of monel metal, hard rubber and lead and complete with hard rubber, stainless, and lead equipment but also protected with proper rubber and protective coatings.

To meet the customers' rigid requirements; to comply with all underwriters standards and all safety provisions; to tell the whole story would fill this magazine . . . suffice it to say that here is a unit worthy of bearing a Peters-Dalton nameplate.

For Finer Finishing Equipment — In Any Industry — It's

PETERS-DALTON Inc.

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HYDRO-WHIRL

Thursday, April 14

PROTECTIVE COATING SYMPOSIUM

9:00 A.M. "Porcelain Enamel as a Corrosion-Resistant Coating" by G. H. McIntyre, Ferro Enamel Corp., Cleveland, Ohio.

9:40 A.M. "Shop Coat Primers for Steel" by S. C. Frye, Bethlehem Steel Co., Bethlehem, Pa.

10:20 A.M. "Writing Specifications for Organic Metal Protective Coatings" by W. W. Cranmer, Industrial Testing Laboratory, Philadelphia Naval Shipyard, Philadelphia, Pa.

11:00 A.M. "Cationic Chemical Pretreatment of Metal Surfaces" by W. T. Deacon, Solvents and Plastics Co., St. Louis, Mo.

OIL INDUSTRY SYMPOSIUM

9:00 A.M. "Corrosion in Petroleum Processes Employing Aluminum Chloride" by R. S. Treseder, Shell Development Co., Emeryville, Calif.

9:40 A.M. (Title unannounced) by E. Q. Camp, Humble Oil and Refining Co., Baytown, Texas.

10:20 A.M. "Anti-Corrosive Lubricants for Internal Combustion Engines" by A. B. Culbertson, Shell Oil Co., Wood River, Ill.

11:00 A.M. "Correlation Between Corrosion Survey Results and Actual Conditions" by I. B. Tietze, Phillips Petroleum Co., Hartlesville, Okla.

SALT WATER CORROSION SYMPOSIUM

2:00 P. M. "Corrosion Resistance of Aluminum and Aluminum Alloys in Sea Water" by William C. Stewart, U. S. Naval Engineering Experiment Station, Annapolis, Md.

2:40 P. M. "Corrosion of Steel Pipe by Chlorinated Sea Water at Various Velocities" by V. B. Volkening, The Dow Chemical Co., Freeport, Texas.

3:20 P. M. "Corrosion of Steel Piling in Sea Water" by H. A. Humble, The Dow Chemical Co., Midland, Mich., and others.

4:00 P. M. "Deterioration of Steel Piling at Palm Beach" by Beach Erosion Board, Washington, D. C.

GAS INDUSTRY SYMPOSIUM

2:00 P. M. "Cathodic Protection of Gas Distribution Systems" by A. W. Peabody and C. I. Woody, Ebasco Services, Inc., New York.

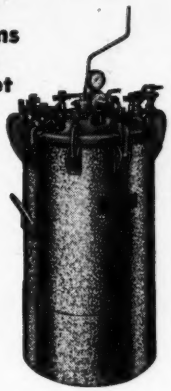
2:40 P. M. "Preparation of Reconditioned Pipe Surfaces for Effective Application of Bituminus Coating" by O. C. Mudd, Shell Pipe Line Corp., Houston, Texas.

3:20 P. M. "The Use of the Thermo Generator for Cathodic Protection" by H. J. Findley, Eaton Manufacturing Co., Cleveland, Ohio.

4:00 P. M. "Field Tests of Sodium Chromates and Alkalies for Controlling Corrosion in the Gas Condensate Wells" by C. Kenneth Eilerts, Bureau of Mines, Bartlesville, Okla.

60 Gallons Top Outlet

30 Gallons Top Outlet



15 Gallons Top Outlet

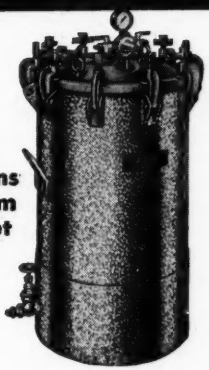
2 Gallons Top Outlet

5 Gallons Top Outlet

10 Gallons Top Outlet

60 Gallons Bottom Outlet

30 Gallons Bottom Outlet



15 Gallons Bottom Outlet

2 Gallons Bottom Outlet

5 Gallons Bottom Outlet

10 Gallons Bottom Outlet

Spotlight on FINISHING Progress

Nickel Coatings on Steel by Immersion

ONE OF the highlights of the 94th meeting of the Electrochemical Society, held in New York City, was a description of a simple method for depositing controlled amounts of nickel on steel by chemical displacement from a hot nickel chloride-boric acid solution. Deposits up to 30 millionth inch in thickness may be readily produced, according to W. A. Wesley, who in conjunction with H. P. Copson developed the process in the laboratories of the International Nickel Company. Suitable heat treatment of the immersion nickel coatings renders them adherent and compact and produces a surface which serves as a better base for many other coatings such as organic finishes, conversion coatings, ceramic enamels, and other metallic coatings.

Bath Composition

The preferred bath composition and conditions for production of the immersion nickel coatings are as follows:

Nickel chloride	600 g./l. (80 oz./gal.)
Boric acid	30 g./l. (4 oz./gal.)
pH	3.5 - 4.5
Temperature	160 deg. F. (70 deg. C.)
Cathode motion	16 ft./min. (desirable but not essential)

Since the nickel coatings are thin they reflect the condition of the steel surface. They are as bright as the metal upon which they are plated.

ROSLEY FINDS IT PROFITABLE!

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WOOD SHOVEL AND TOOL

This Cincinnati "profit-performing," custom-built washing and drying machine is relied on by the Crosley Division of the Avco Manufacturing Corporation.

It incorporates advanced design features to meet the challenge of a high production schedule which emphasizes economy and proficiency.

You too can depend on Cincinnati to solve your cleaning problems. Write or wire our engineers today for full information, without obligation.

Cincinnati

CLEANING AND FINISHING MACHINERY COMPANY

IRONTON, OHIO

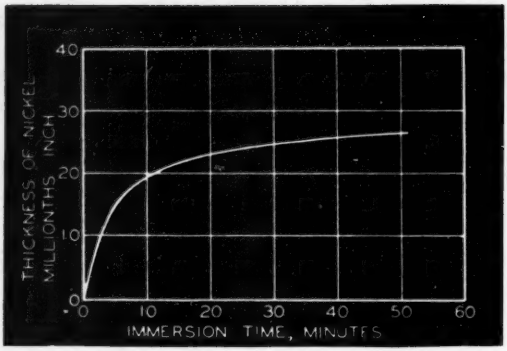

Fig. 1—Curve showing the thickness of nickel coating produced as a function of the time of immersion in the solution
(*Illustration courtesy The Electrochemical Society*)

It was pointed out by Dr. Wesley, in describing the process, that any smooth clean surface appears satisfactory, but it should be free from inclusions or non-conducting areas. Rubber-lined steel, hard rubber, and cast high silicon irons can be used successfully for handling the immersion nickel coating solution; lead-lined equipment is unsatisfactory since lead corrodes rapidly in the solution.

Thickness of Nickel Coating

The thickness of the nickel coating increases with the time of immersion. The curve shown in Fig. 1 shows the thickness of the nickel coating that is produced as a function of the time of immersion and is based on the experience gained by coating over 850 pieces of 13 heats of steel. The efficiency of the process is close to 100 per cent if calculated on the basis that it is a simple chemical displacement reaction as follows:

$$Fe + Ni^{++} \rightarrow Ni + Fe^{++}$$

As compared with electroplating, the immersion coating process affects all parts of the article being coated identically. There is no problem of throwing power and the deposit is not thicker at the edges than at other points on the article surface.

Operation of the Bath

For deposition of nickel to occur, iron equivalent to the amount of nickel displaced must dissolve in the solution. After it dissolves it becomes oxidized to ferric iron and precipitates as ferric hydroxide. In order to maintain a constant pH, the hydrochloric acid thus liberated must be neutralized. To maintain a minimum of porosity in the nickel coating the precipitate must be removed; on a commercial scale the best practice would be to remove the iron continuously and replace the nickel that is lost frequently. To prevent staining, the deposits must be rinsed and dried quickly.

Heat Treatment of Coatings

A high temperature treatment in a reducing atmosphere serves to sinter the nickel coating, to decrease porosity, and to increase adhesion. This treatment causes diffusion of the nickel into the iron and the optimum degree of alloying varies with the intended use of the product. A metallographic cross-section through a typical nickel immersion coating after a mild 30 minute anneal at 650 deg. C. (1200 deg. F.) is shown in Fig. 2.

Properties of the Nickel Coated Steel

Upon severely bending a specimen of nickel coated steel after heat treatment, it was stated that the surface alloy layer cracks but does not flake off. According to Wesley, on the inside of the bends the coating follows the folds in the steel surface. Although

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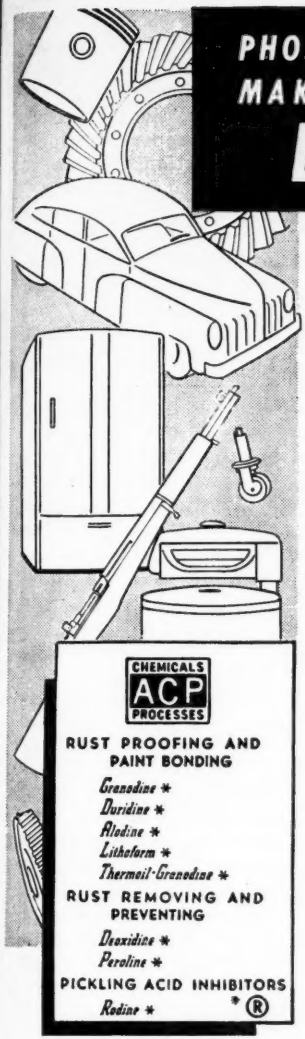

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corrosion tests indicate that the porosity of the thin heat treated nickel deposits is too great to permit their use without further modification in applications where rusting must be avoided, this limitation, according to Wesley's interpretation, plays very little part in possible utilization of nickelized steel as a base for other coatings such as ceramic enamels, organic and conversion coatings, and outer layers of tin and zinc.

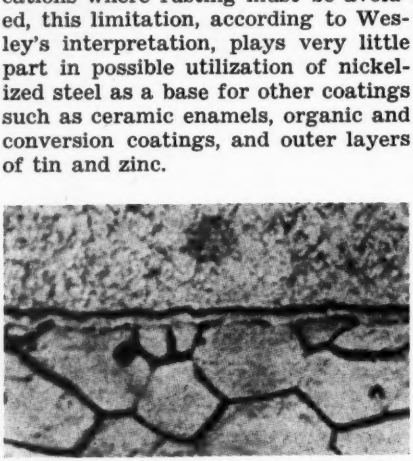

Fig. 2—Photomicrograph showing cross section through heat-treated immersion nickel deposit 30 millionth inch thick. The upper portion of the illustration shows the heavy nickel plate used to protect the edge of the sample during preparation. The double line through the center of the micrograph shows the immersion deposit in the heat-treated condition. The crystalline structure shown in the lower portion of the micrograph is the steel base upon which the nickel has been deposited.
(Illustration courtesy The Electrochemical Society)

Indications that nickelized steel may have merit as a base for organic coatings were obtained in tests involving exposure in a constant-temperature, constant-humidity room, which were conducted in cooperation with the Mellon Institute of Industrial Research. In the test conditions used the temperature was 21 deg. C. (70 deg. F.) and the relative humidity was 65 per cent. It was reported by Wesley that these tests showed that as little as 7 millionth inch of nickel prevented "underfilm" corrosion of panels of nickelized steel coated with baked Vinylite-type lacquer during an exposure period of 10½ months, provided that a mild annealing heat treatment of 45 minutes at 650 deg. C. (1200 deg. F.) had been used in preparing the nickelized steel. In another test reported, which was of 22 months' duration, the results showed that 14 millionth inch of nickel substantially retarded corrosion of the nickelized steel and practically prevented corrosion under Vinylite films. Also it was reported that a few panels with Vinylite and phenolic-type films were allowed to remain in the constant test conditions for four years, and continued throughout this period to prove the advantages of the nickelized steel as a base for organic coatings.

The fact that the resistance to rusting is greatly improved by heat treatment suggests that there is diffusion not only in a direction normal to the steel-nickel interface, but also in a lateral direction, leading to some alloying of the previously bare anodic spots. If the annealing treatment is prolonged, to resemble commercial steel-mill box annealing, the corrosion rate in the outdoor atmosphere is greatly reduced. A long diffusion annealing period is also advantageous when a high iron-nickel alloy surface is desired, as for good adhesion of ceramic enamels. For other uses, a milder heat treatment may be preferable. For example, as shown in the tests described by Wesley, humidity chamber exposure tests of nickelized-steel panels coated with organic lacquers indicated that a 30 minute heat treatment at 650 deg. C. (1200 deg. F.) yielded a superior product.

* * *

Protecting Metals with Organic Paint Coatings

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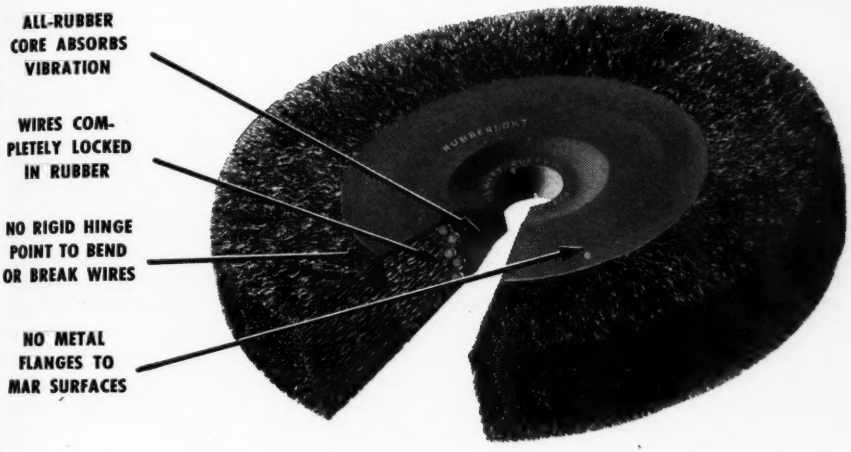
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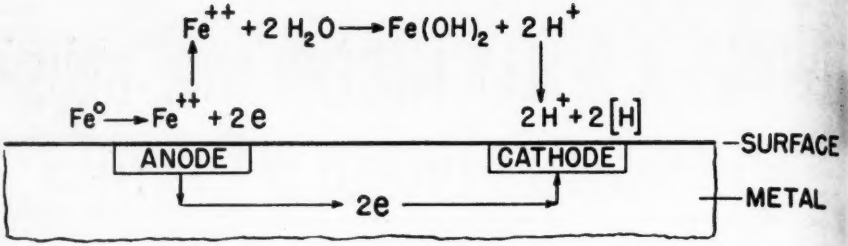

Fig. 3—Electrochemical concept of corrosion of iron
(Illustration courtesy "Corrosion")

metal through physical and chemical processes. A common example is the rusting of iron. Corrosion is essentially the formation of a more stable compound by the metal.

In a paper presented at the Annual Meeting of the National Association of Corrosion Engineers in St. Louis, and subsequently printed in "Corrosion," October 1948, A. J. Eickhoff and W. E. Shaw, National Lead Co., Brooklyn, N. Y., paraphrase the common expression to read, "Never underestimate corrosion," pointing out that corrosion is an ever-present destructive force.

In our rapidly changing economy, a fundamental knowledge of corrosion and its control is becoming increasingly important; and the way to gain this knowledge is through research. Through the years research has been responsible for the various theories to explain the mechanism of attack and account for the protection afforded. One by one, the various theories, such as the peroxide theory, the oxygen attack theory, and the alkaline theory, have failed to explain certain observations. As a result, they were discarded for a new one. At present, the electrochemical theory of corrosion is most commonly accepted.

Electrochemical Theory

The electrochemical theory was proposed by Whitney and championed by many, notably Bancroft. Briefly, the theory states that corrosion is occasioned by the formation of two poles—an anode and a cathode. At the anode, the metal, iron for example, by virtue of its solution pressure, goes into solution as ferrous iron having lost two electrons in the process. These electrons flow through the metal to a cathodic area where they convert hydrogen ion to nascent hydrogen. This hydrogen may combine with itself to give hydrogen gas or with the oxygen in the surrounding environment. Fig. 3 illustrates the general mechanism of corrosion according to the electrochemical theory. Causes of potential differences include heterogeneity of the metal or alloy, presence of grain boundaries, difference in orientation of grains and grain size, differential thermal treatment, variations in surface roughness, presence of local scratches or abrasions, and so on.

As a general concept, regardless of mechanism, it may be said that corrosion will take place whenever a decrease in free energy occurs between a metal and a possible reaction product. At present, no concept of rate is given by this type of treatment.

Adhesion

Eickhoff and Shaw define adhesion as the establishment and maintenance of a bond between the substrate and the paint film. The bond can operate by two distinct mechanisms. The first is mutual attraction of the substrate and the paint, probably of an electrical

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nature; the electrical forces may be of either the polar or ionic type. The second is mechanical—a keying of the paint film to irregularities in the subtrate surface; a roughened surface provides a large number of pits and valleys to increase the effective area of the surface to be coated, allowing the electrostatic forces to be better utilized.

Adhesion is operative normal to the plane of the metal or parallel to its surface. Where rough contoured surfaces are available, mechanical adhesion is, or approaches, a maximum limited by the shear strength of the film. A further limit on this maximum is occasioned by the ability of the paint to "wet" the surface and penetrate the crevices. For if "bridging" or poor wetting occurs, any possible mechanical adhesion would be reduced by the amount and degree of bridging.

A phosphatized metal surface, according to Eickhoff and Shaw, can be more easily wetted. Inasmuch as these converted surfaces are firmly adherent, the promoted adherence of the paint to the new surface will result in a greater overall adherence of the paint to the surface. An examination of the electrical or polar forces at the metal-paint film interface is necessary to explain certain adhesion effects. The most active force involved is probably dipole-mirror dipole. Thus, the illustration in Fig. 4 shows that there are two attracting and two opposing forces, the attractive forces being of higher magnitude.

Blistering

The blistering of paint films has been an ever-present problem, especially with regard to paints formulated to protect submerged steel surfaces. Water penetrates into the paint film at a greater rate than the reverse flow can take place, causing a build up or pressure increase at the film-metal interface. Therefore, blisters are occasioned by the preferential transfer of water through the semi-permeable paint film. As soon as the water dis-

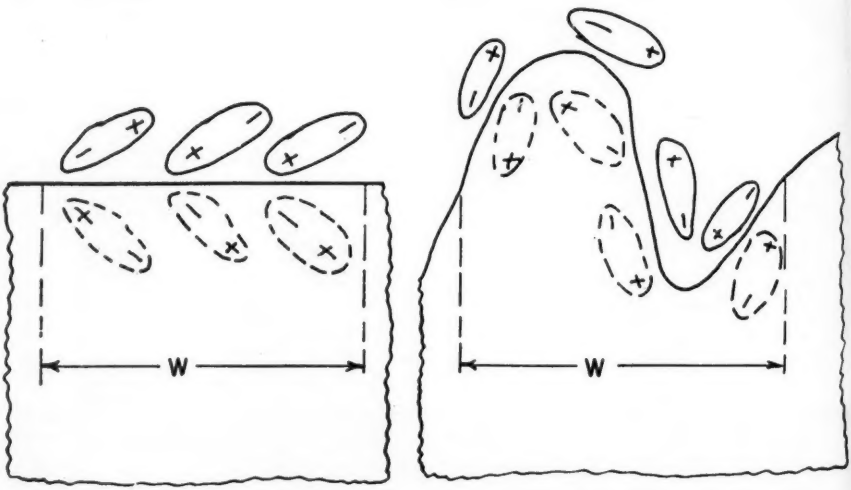

Fig. 4—Dipole-mirror dipole forces on a plane and a sandblasted area
(Illustration courtesy "Corrosion")

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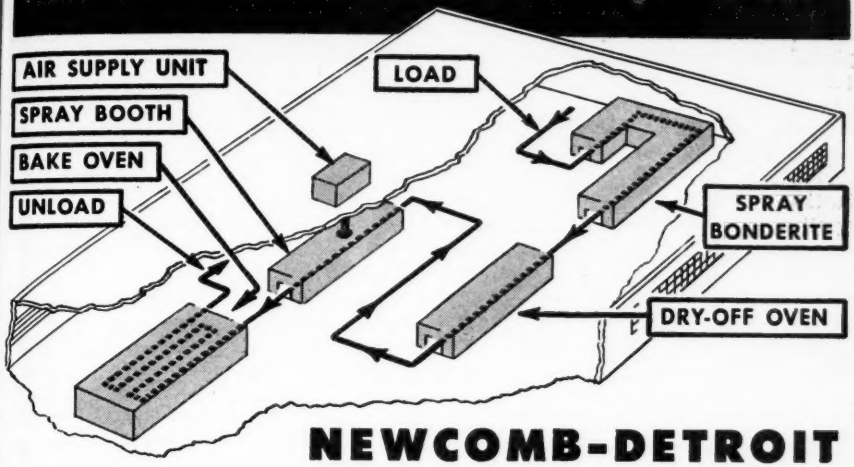

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solves some of the constituents in the film, osmotic effects occur. The membrane expands to accommodate the increase in volume occasioned by the osmotic effects. A potential gradient occasioned by electric currents or corrosion potentials results in the same phenomena of preferential water flow (electroendosmosis). Eickhoff and Shaw quote Kittleberger and Elm as follows: "Osmosis is defined as the transfer of water through a paint film under the influence of a solute concentration gradient; electroendosmosis applies to the movement of water through a film under the influence of an electrical potential gradient." The potential gradient is generated by the rapid corrosion of the bare metal anode, making the balance of the plate cathodic.

Protective Surface Treatments

The corrosion of steel has been labeled as "The Common Cold of the Steel Construction Industry." Rust and corrosion can always be avoided, provided one devises a means of furnishing adequate protection. Proper surface preparation is the first step in furnishing such protection. There are a number of methods from which to choose. Some are impractical to use after the steel has been erected.

In most instances weathering is disastrous and is to be avoided. Such a practice results in a surface which has rust, pits, partially loosened mill scale, and moisture present.

Flame cleaning makes use of the intense heat of the oxy-acetylene flame which is rapidly passed over the steel surface. The interior and the surface of the steel member set up stresses which help remove semi-adherent mill scale. The high temperature involved also dehydrates the rust. As a result, the surface is dry and warm. These two conditions are advantageous in promoting faster drying and better wetting by the paint.

Acid pickling requires the use of hot aqueous solutions (5-10 per cent of hydrochloric or sulfuric acid, or nitre cake, along with suitable inhibitors). Such a treatment leaves the desired clean surface for painting.

Descaling and cleaning steel by sandblasting involves the use of sand or steel grit or shot impinged on the surface by a stream of air at pressures of from 30 to 90 pounds per square inch. Often water is introduced to reduce the dust hazard. Too much sandblasting can result in a surface with excessively deep crater-like depressions. The subsequently applied paint film may have inadequate thickness over the ridges which become focal points for premature failure, particularly if only one coat of paint is used.

Phosphatizing utilizes a hot or cold aqueous solution of metallic phosphates and phosphoric acid. In this process a tightly adherent metallic phosphate is formed at the surface of

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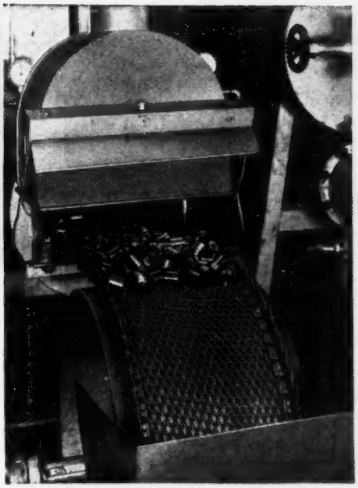

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the metal and this promotes adhesion of subsequent paint films.

Cathodic cleaning cleans metallic surfaces, partially or completely submerged in sea water, by means of a direct electric current of 0.03 to 0.40 ampere per square foot of cathode surface. The anodes may be iron or graphite. In the cleaning process a coating of calcium and magnesium salts is also formed.

Metal Primers and Topcoats

Organic protective paint coatings generally comprise multiple films, each of which is selected to perform certain functions. Briefly, the functions of the prime coat are to provide a tightly adherent base upon which to apply subsequent paint coats, prevent corrosion of the base metal by the presence of a corrosion inhibitive pigment such as red lead, and to partially provide a barrier to the external corrosive environment. In limited instances, the primer can serve as both prime and finish coats. It has been found that the performance of paint coatings must be regarded as a unit or system. In other words, not only must the individual paint coats comprising a system be selected for their function of combating the effects of corrosive environments, but they must be properly formulated to tenaciously adhere one to the other to prevent intercoat peeling, and they must acquire the proper degree of hardness within a specified time so that subsequent coats will not cause lifting.

While the primer paint film shields the steel against external corrosive agents, such as salts, acids, and moisture, and the top coat paint film protects against abrasion, mechanical damage, and ultraviolet light, there may be some discussion as to just where each type of protection begins and ends. When a paint coating contains an inhibitive pigment, the sur-

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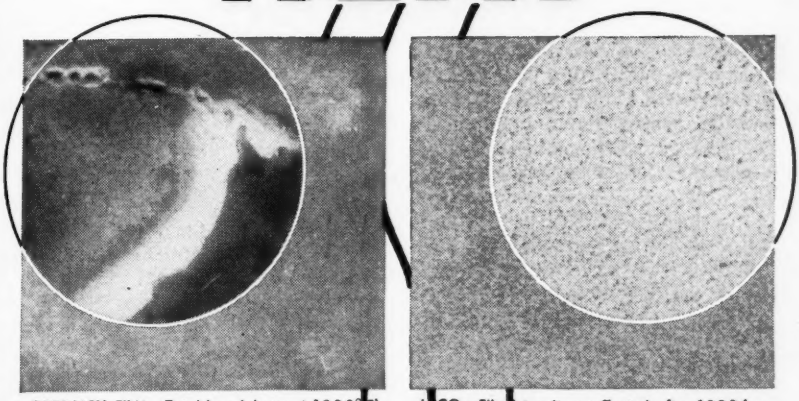

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face of the metal is altered due to the formation of a protective layer or barrier. As a result, the moisture impermeability of the primer is of secondary importance. This is pertinent since it has been found that all metal protective coatings are moisture permeable. Hence, in choosing a metal protective paint, one should use an effective corrosion inhibitive pigment such as red lead in the primer coats to render the metal passive. The top coats should be designed to withstand the intended exposure environment to provide maximum water resistance as well as protection against abrasion, mechanical damage, and ultraviolet light.

Summary

The realization of maximum protection of metal surfaces by means of organic paint coatings requires careful consideration of the following: (1) thorough cleaning and surface preparation so as to include the removal of all rust, moisture, and mill scale; (2) controlled composition of the paint with regard to non-volatile vehicle, thinner and inhibitive pigment; (3) character of the base metals; (4) the environment to which the painted metal is exposed, alkaline, acid, or saline; (5) the degree of mechanical injury likely to be encountered.

* * *

Scale Removal Methods Important Factors in Stainless Steel Finishing

IT has been pointed out by K. M. Huston, Armco Research Laboratories, Baltimore, Md., speaking at the 1948 Northeastern Regional Meeting of the American Electroplaters' Society, Rochester, N. Y., that the scale formed on stainless steel is generally tenacious and may be somewhat more difficult to remove than scale on carbon steel. However, two basic methods are used: mechanical, such as sandblasting and tumbling; or chemical, such as pickling in acid solutions or molten salt. However, it was emphasized that if parts are to be placed in service with a mechanical finish, not to be later polished or buffed, they should be cleaned thoroughly by pickling and as an added precaution, by passivation.

Frequently it is practical and cost-saving to blast the scale on stainless steel parts which have been subjected to high temperatures. This procedure serves to break up the hard scale and thus render it more responsive to pickling operations. Both air-driven and rotary impelled sand, stainless steel shot, or aluminum oxide grit are used; fragments, deburred particles or other fines must be avoided. Conditions should be controlled so that unevenness of surface does not occur to such a degree that it will interfere with subsequent grinding and polishing.

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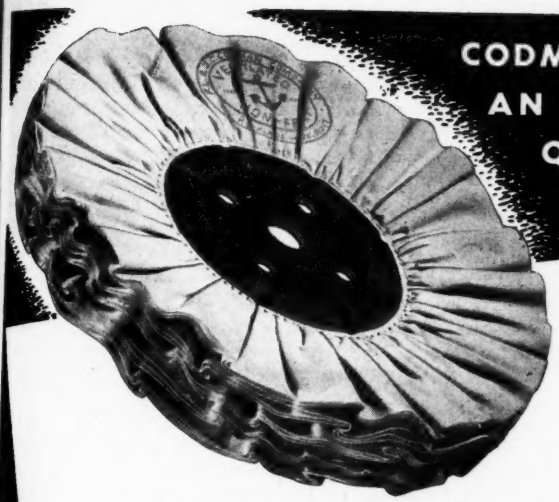

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Although blasting stainless steels is an essential step in many instances, it is not usually employed for products made of sheet, strip or tube. One thing that should be remembered in blasting operations is that the force of the blasting stream must be kept diffused, in order to avoid unwanted surface irregularities. Even if all of the scale has apparently been removed by blasting, it is recommended practice to pickle and passivate the parts subsequently. Some fabricators are satisfied in some applications with the utilitarian finish and the degree of corrosion resistance thus produced. However, it was brought out by Huston that the rough surface resulting from blasting lowers the corrosion resistance of stainless, even after passivation, and that the corrosion resistant properties can be restored by electropolishing.

Tumbling is generally employed on parts which have been stamped, machined or drawn to practically a completed shape. In many instances, a final finish approaching that of a buffed finish may be obtained by the proper selection of abrasive, speed of rotation and time.

According to Huston, the scale formed on stainless steels during forging, heat treating, welding and other high temperature processing will vary greatly with the grade and the heat treating environment. The straight chromium grades are generally harder to pickle. One procedure, recommended by Huston for pickling, consists of two steps involving the use of sulfuric or hydrochloric acids, followed by immersion in a nitric-hydrofluoric acid solution. The first step in the proced-

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ure employs 8 to 11 per cent sulfuric acid at 150 to 160 deg. F. for 10 to 45 minutes, or a 10 to 15 per cent solution of hydrochloric acid at 120 to 140 deg. F. for 30 to 90 minutes. A suitable inhibitor may be used and the parts should be thoroughly rinsed before proceeding to the second step. The second step consists of immersing the parts in a 6 to 8 per cent solution of nitric acid, containing 1½ per cent hydrofluoric acid, at room temperature, for 10 to 30 minutes or until the smut is removed.

It was pointed out by Huston that the high carbon grades of stainless (Types 420, 440A, 440B, and 440C) should never be acid pickled in the fully hardened condition. Stress relieving at 300 to 700 deg. F. for 1 to 2 hours after hardening and before pickling is essential to avoid pickling cracks. These grades also require careful watching during the pickling operation to prevent severe etching. Thus, if the scale is not removed at the end of 2 or 3 minutes, polishing with a loose buff or sandblasting may be required. A passivating treatment should follow these operations. It was also emphasized that care should be taken in pickling these grades in the fully annealed condition. Unlike other stainless alloys, they are attacked in this condition by nitric acid and the surface of annealed parts may be roughened by over-exposure to this acid.

Huston stated that no attempt should be made to remove scale with a wire brush unless it is a stainless wire brush. Particles of steel from the wire brush will imbed themselves in the stainless and show rust in a very short time. Pickling, subsequent to wire brushing, is not very effective for removing the imbedded particles. Although stainless steel wire brushes are available, it was pointed out that commercial grinding compounds free of iron are probably more economical than stainless steel wire brushes.

In general, the methods used for cleaning ordinary steels may be used for stainless. Regular degreasing processes and proprietory cleaners may be used in much the same way as for carbon steel. Metal lubricants, such as copper, lead and cadmium are applied to stainless wire for cold heading, wire drawing or spring winding. They may be removed by immersing in a 20 per cent solution of warm nitric acid. This solution is also effective in removing lime and lime base mixtures used in tumbling and burnishing operations. Weld stains and rusted areas from surfaces which were not passivated after fabrication, may be removed by treatment with 50 per cent hydrochloric acid or 10 per cent nitric acid. Although the hydrochloric acid will clean more quickly, the nitric acid treatment is considered safer. Thorough rinsing with water and prompt drying after this operation are essential to the preservation of the

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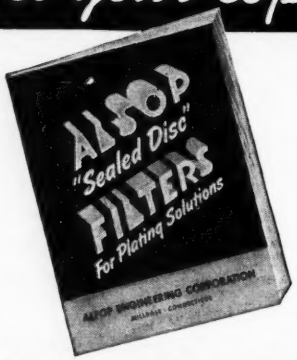

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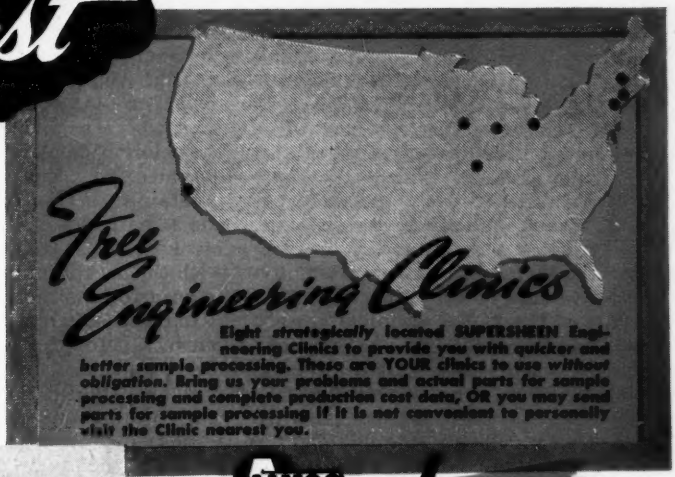

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Eight strategically located SUPERSHEEN Engineering Clinics to provide you with quicker and better sample processing. These are YOUR clinics to use without obligation. Bring us your problems and actual parts for sample processing and complete production cost data, OR you may send parts for sample processing if it is not convenient to personally visit the Clinic nearest you.

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The "before and after" photos at left are *unretouched* and show only three of the countless thousands of applications of the Almco SUPERSHEEN process — America's Most Versatile Barrel Finishing Process. Whether deburring, cutting down, finishing to micro-exactness, or coloring, this superior barrel finishing method does it *faster, better,* and at *lower cost.* In a study of ten typical SUPERSHEEN installations, operation savings averaged 80.1% *less* than former methods — from 48% on a threaded cast iron pipe "T," to 95% savings on a steel trigger with intricate configurations.

The SUPERSHEEN line consists of (1) Advanced Design *Precision* Tumbling barrels in sizes from 8" x 16" up to 60" x 30"; (2) *Automatic* loading, unloading and separating equipment; (3) A vastly superior grinding and finishing medium in 2 grades and 9 sizes.

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A BETTER FINISH FASTER

ALMCO DIVISION — QUEEN STOVE WORKS, INC.
***Factory and General Offices*—ALBERT LEA, MINN.**

cleaned finish.

The same general equipment used for grinding, polishing and buffing ordinary steel may be used for stainless steel. The surface speed of the wheel, however, is generally higher, running from 5,000 to 10,000 surface feet per minute. One word of caution was brought out regarding the care to be exercised to avoid overheating stainless while grinding, polishing or buffing. Stainless has low thermal conductivity and high abrasive resistance. The operator should not try to overcome the high frictional quality by too much pressure on the wheel. The light gauges of the 18-8-S stainless variety may be distorted and the straight chromium types may gall or score if this precaution is not heeded.

Accepted commercial procedures are available for coloring stainless and for plating on stainless steels. A blackening process described by Huston is applied by pickling and drying the parts, then immersing them in a molten bath of sodium bichromate at 750 deg. F. for 20 to 30 minutes. They are then removed, cooled, rinsed and dried. Also described was a process for gold tinting, which is expected to find applications in automotive decorative trim where a gold color is desired in the color scheme along with the utility obtained from the physical properties of stainless. This color is applied in the same manner as that used for the black oxide coating described above, with the exception that sodium nitrate is used for the molten salt.

In discussing plating, it was brought out by Huston that various metals are electrodeposited on stainless for color matching, lubrication in cold heading, coil forming and wire drawing processes, to prevent galling and to prevent superficial rusting where appearance is important. In plating on stain-

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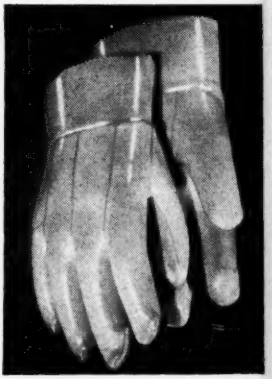

Jumbo size, curved fingers — knit wrist, band-top, gauntlet, and ventilated back types.

Surety's newly developed Sureseal PK Coating far surpasses rubber and standard synthetics in resistance to virtually all industrial chemicals — plating solutions, pickling solutions, paint dryers, acids, alkalis, hydrocarbons, solvents, and so on down the list.

And Sureseal PK can take it on your toughest jobs—the coating won't crack or peel. Outwears any other coated glove by miles, yet costs no more than ordinary oil-resistant synthetic coated gloves.

For complete information write to Dept. F.

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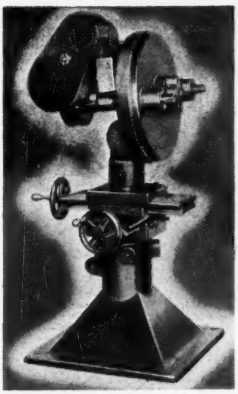
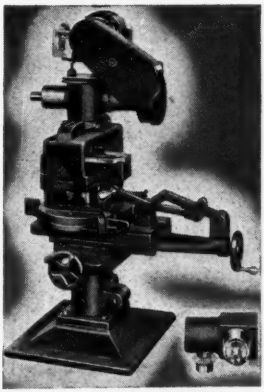


ACME Type A-2



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. . . have nearly half a century of experience behind them!

• Acme Semi-Automatic Polishing and Buffing Machines are time tested producers that are cutting costs and maintaining production levels on finishing operations in industry.

This rugged dependable line of machines is available in a variety of types suited to a wide range of work. They are versatile and adaptable to many sizes and shaped parts . . . and have demonstrated their worth for years.

TOP PHOTO:

This two spindle, hand indexing machine is used in conjunction with the conventional lathe for polishing and buffing cylindrical parts up to 12 inches in diameter such as hub caps, clock cases, covers, headlight bodies, plumber's brass goods, electrical parts and hardware. Production ranges from 100 to 600 per hour or more depending on nature of part and finish required.

BOTTOM PHOTO:

This single spindle unit is used with the conventional lathe to handle such parts as cooking utensils, fire extinguishers, and lamp parts. It has a stroke adjustable from zero to 14 inches for oscillation across the wheel face. A right angle attachment permits work to be held at right angles to the spindle.

Additional features such as vacuum chucking, timer control and A-2 Head can be furnished.

SPECIAL MACHINERY AMC AUTOMATIC BUFFING MACHINES

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less, the surface is first activated to remove the passive film by immersing the parts in 20 per cent sulfuric acid at 160 to 200 deg. The parts should be allowed to gas freely for one minute, then rinsed well in running cold water, and transferred to the plating bath while still wet. The treated parts should not be allowed to dry before immersion in the plating bath, since under such conditions the passive film will form again.

Palladium is reaching new heights in popularity as a precious metal for jewelry. It is very similar to platinum in appearance and durability and more articles per ounce are obtained from the lighter palladium which has been used for industrial purposes for many years. Fashion designers and retailers now have a better appreciation of the importance of palladium to the jewelry industry. The whiteness and reflectivity of palladium enhances the color and brilliance of diamonds and other jewels, and palladium settings will hold the gems securely.

The communications industries are using large quantities of palladium for innumerable electrical contacts, such as in the telephone system where several hundred tiny contacts are utilized in dialing a single call. In the synthesis of vitamins, and other products of modern chemistry, palladium catalysts are simplifying processes and reducing costs to consumers. Palladium catalysts have assumed much more commercial importance recently.

Osmium is used chiefly in the production of pointing materials that must have great resistance to wear. An example is record-player needles where small highly polished points containing this metal are fused to the needle. It is seldom necessary to change needles of this type.

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USE HARRISON'S
4A
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YOU FURNISH THE PROBLEM...
WE WILL FURNISH THE ANSWER
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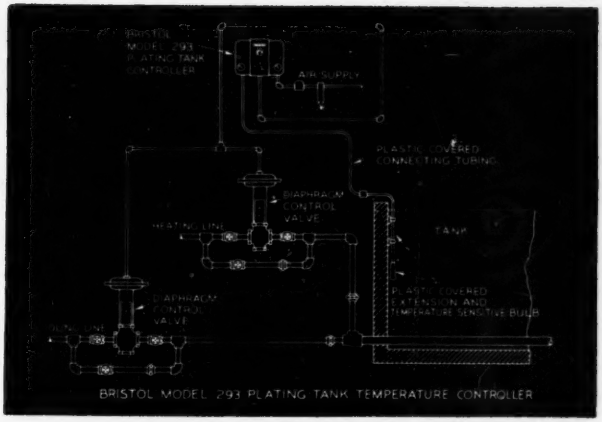
Putting Temperature Under Strict Discipline Gives You



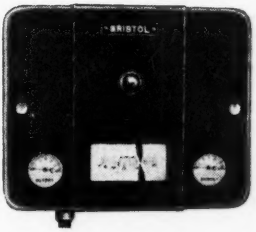
BRISTOL MODEL 293 PLATING TANK TEMPERATURE CONTROLLER

Uniform Plating at Less Cost

Under the watchful eye of the Bristol Automatic Plating Tank Controller, temperature behaves exactly as you want it to.

The accurately calibrated measuring element of the Model 293 controller is built to withstand years of service. Its famous Bristol air-operated control operates without any retarding effect on the measuring element. The complete instrument is simple in construction and compact; can be furnished with bulb and tubing made in whatever material is needed to stand up in the particular solution.

New plastic-coated bulb and tubing eliminates corrosion and contamination . . . prevents electrical "shorts" — no insulated bushings needed. Write for details. The Bristol Company, 108, Waterbury 91, Conn.



Bristol Model 293 Air-Operated Temperature Controller for plating. Controllers can be installed for steam heating and water cooling as shown above or for either steam or water.

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PRACTICAL APPLICATIONS *of Modern Products*

Infra-Red Ovens Speed Lincoln-Mercury Production

THE Ford Motor Company has made an improvement in automotive finishing processes through the installation of "short cycle heating" equipment in two of its new Lincoln-Mercury assembly plants. Nine ovens of the new type combining both controlled convection and infra-red heating have been installed for baking prime and first color coat finishes.

The ovens are being used on production lines for bodies, fenders, hoods, wheels, and other sheet metal parts. The heat capacity ranges from 100 to 700 kw. each and the oven lengths vary from 20 to 170 feet. A total of 3,750 kw. of this new type of heating has been installed, effecting a space saving of over 20,000 square feet, as compared with former types of convection equipment. At prevailing rates the estimated saving in the cost of floor space pays for approximately 35 per cent of the total power consumed.

The heating schedule calls for a temperature of 325 deg. F., to be attained in the first three minutes and held for

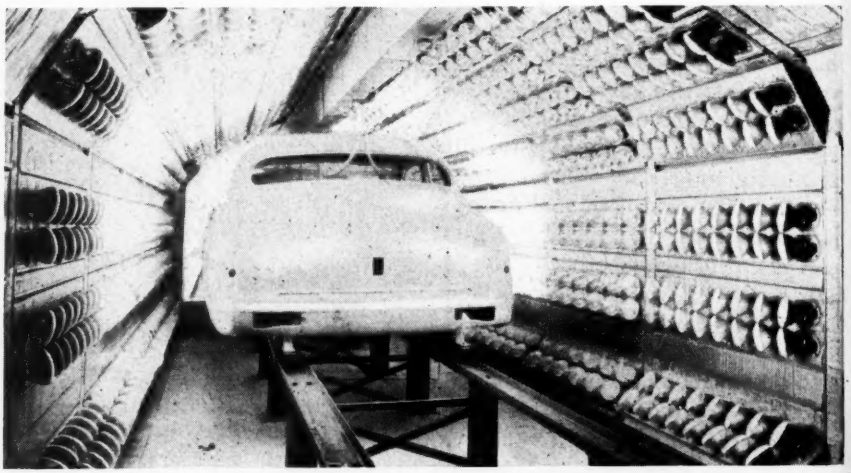
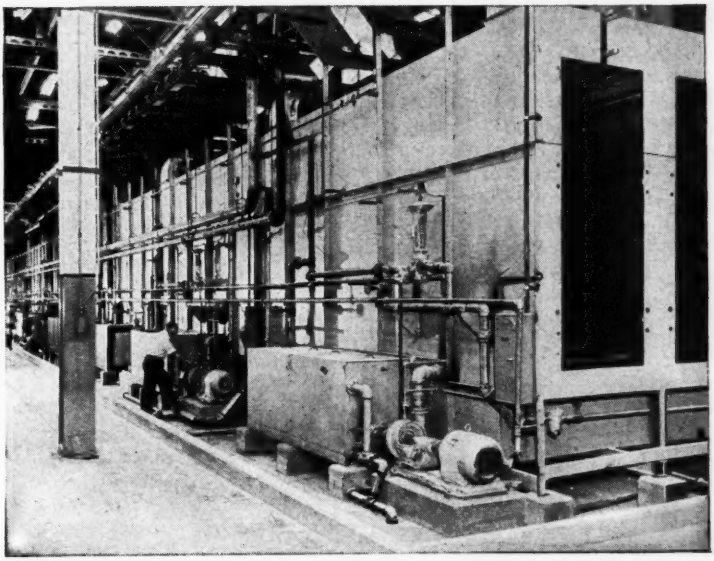
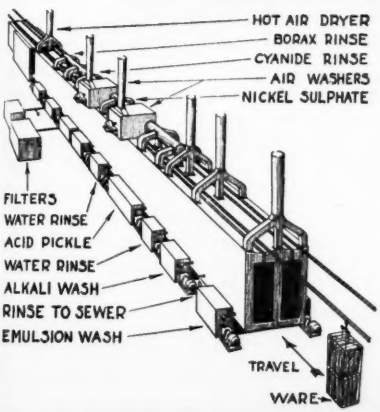


Illustration shows car body being processed through infra-red oven.
(Photo courtesy Trumbull Electric Mfg. Co., Plainville, Conn.)

HOW TO PICKLE A HOUSE



METALWASH Spray Picklers automatically prepare LUSTRON HOUSES for porcelain enameling



At Lustron Corporation's plant in Columbus, Ohio, mammoth Metalwash spray picklers clean the various parts of steel houses prior to porcelain enameling, automatically taking them through the cycle as shown.

These machines produce clean, nicely etched surfaces, properly nickel coated, neutralized and dried. Automatic operation eliminates handling, increases production, and permits accurate control of the entire cycle. Rejects due to improper cleaning and pickling are virtually eliminated, and adherence qualities are greatly improved.

For better metal cleaning submit your problems to METALWASH.

METALWASH MACHINERY CORP.
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a period of 6 to 12 minutes on the various products. The ovens handle a total heating load of over 60 tons per hour, and the power supply is interlocked with the conveyor system to avoid overbaking in the event of interruption to the production lines.

A positive air pressure is maintained in the ovens through the use of air recirculation and air curtains at the work entrance and exit openings. The exit curtains provide for heat recuperation at the end of the cycle and the remaining heat is removed by water sprays as the work enters the rubbing decks. The ovens were fabricated jointly by Peters-Dalton, Inc., Detroit 12, Mich., and the Trumbull Electric Manufacturing Co., Plainville, Conn. Installation of the equipment, including electric feeders, was handled by F. H. McGraw & Company as the general contractor.

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IN YOUR METAL CLEANING BATHS

You'll find this synthetic detergent effective
—as a wetting agent
—as an emulsifier
—in dispersing lime soaps which might cause poor plating if allowed to deposit on the metal
—in speeding rinsing — minimizing water marks

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Willys-Overland Aeration Machine Tests Paint Stability

THE Willys-Overland aeration machine was designed by J. G. Piceu for the purpose of accelerating conditions which occur in a paint dip tank. Its simplicity in operation and uniformity of results have been proved on production versus laboratory tests. Although the basic principle of this machine is not new, the machine in its present design is original. Paint is rotated at a 45-degree angle making 15 revolutions per minute. (Pint containers are used for holding the test samples.) As the container revolves, the paint travels up one side of the container and down the other, always seeking the lowest point of gravity. This action is very similar to the dipping action received when parts are lowered and elevated in a dip tank. The aeration involved and dripping back of the paint in a production dip tank are all similarly duplicated in the aeration machine except in a much more rigorous form, as much as twenty to fifty times faster.

Of course, the aging of paint in a dip tank is largely dependent on the size of the tank, the surface area of material run through the tank, the viscosity of the enamel, and care of tank

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FRESH SUPPLY AVAILABLE
KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

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You, too, can have the advantages of Bonderizing on your aluminum! You can have assured, lasting paint adhesion, protection from corrosion and oxidation, and prevention of peeling and chipping.

Bonderizing for aluminum is effective, economical, quick, and simple. On sheets or castings of this metal and its alloys, the Bonderite crystals form a tight nonmetallic phosphate coating which becomes part of the metal itself. Paint finish, applied over Bonderizing, is there to stay, and retains its fine appearance through years of hard service.

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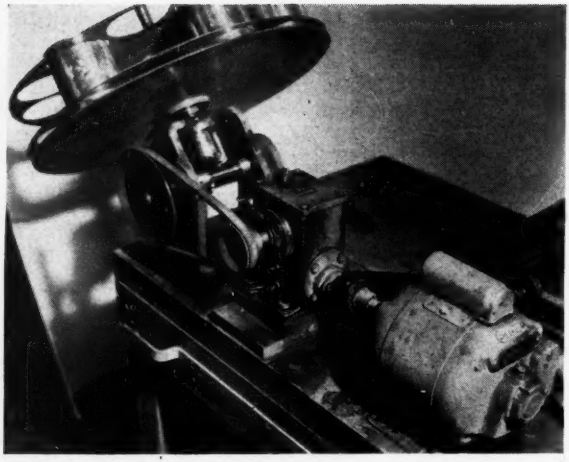


Illustration shows Willys-Overland Aeration Machine with test cans in place. (*Photo courtesy Willys-Overland Motors, Inc., Toledo 1, Ohio*)

when not in operation. Other contributing factors are the volatility and solubility of solvent, the temperature of the paint, and the amount and type of contamination. Not all of these conditions can be duplicated on the aeration machine. Tests will be comparative, however, and if run against known standard materials, definite conclusions can be drawn.

From test results, together with the experience that has been obtained with production dip tanks, Willys-Overland has been able to conclude that a 30-day run in its 2,500-gallon dip tank can be reasonably duplicated in one to two days on the aerating machine. A 10-day accelerated test has proven that a paint should last indefinitely in a dip tank with 3 to 5 per cent additions of new material daily.

In addition to the described use of the aeration machine for testing dip tank paints, tests have been devised for determining the stability of spray type paints. For the latter purpose, the paint is reduced slightly below spraying viscosity and rotated 72 hours. Considerable thinner is usually lost by evaporation, and this loss is replaced every four hours. This procedure makes necessary an interruption of the test at the end of each day. The cans are covered to prevent loss of thinner by evaporation during the night. To make possible the continuous operation of this test, a procedure is now being developed involving the use of a perforated lid for the test can so that thinner evaporation is retarded sufficiently to permit continuous operation of the test machine.

A basically new, primary standard of frequency and time, invariant with age, has been developed at the National Bureau of Standards; an atomic clock based on a constant natural frequency associated with the vibration of the atoms in the ammonia molecule. Based on a principle developed by Dr. Harold Lyons of the Bureau's microwave research laboratory, the new clock promises to surpass by one or two orders of magnitude the accuracy of the present primary standard, the rotating earth. Dr. Lyons was assisted in the design and construction of the clock by B. F. Husen, E. D. Heberling, and other members of his staff.

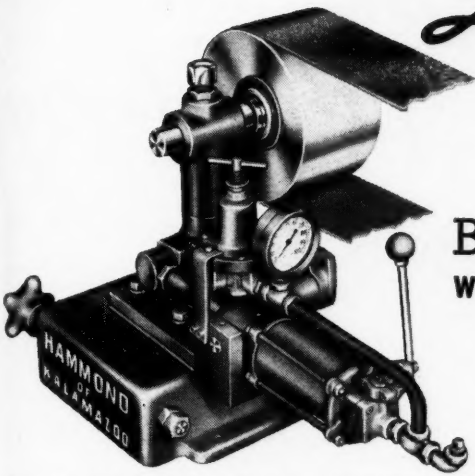
This is the first atomic clock ever built and is controlled by a constant frequency derived from a microwave absorption line of ammonia gas, providing a time constancy of one part in ten million. Theoretical considerations indicate a potential accuracy of one part in a billion or even ten billion, depending on the type of atomic system and spectrum line used.

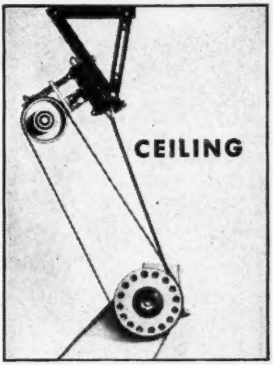
Hammond of KALAMAZOO

AIR

Bench Backstand

WITH AIR BELT TENSIONING



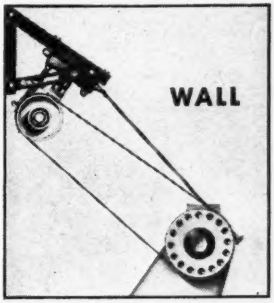


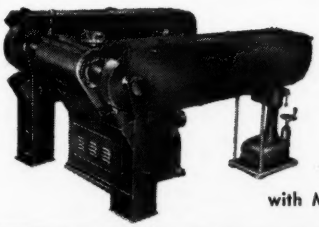
The Model 6-A Air Backstand SAVES ABRASIVE BELTS — INCREASES PRODUCTION — CONSERVES FLOOR SPACE.

An abrasive belt stretches as used. If correct tension is constantly maintained the belt will last longer and maximum production obtained.

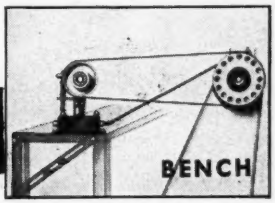
The Model 6-A Air Cylinder tensioning backstand maintains the correct tension throughout the abrasive belt life and automatically adjusts belt stretch to a fraction of an inch.

Write for catalog showing the Model 6-A and our complete line of 9 bench and floor-type backstands.





Another popular installation—Model VRO Variable speed (1500-3000 RPM) polishing lathe with Model 3-R Backstand.



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1622 DOUGLAS AVE. • KALAMAZOO, MICHIGAN

NEWS of the Industry

NEW PLANTS

A new warehouse for the Paint and Varnish Division of **THE GLIDDEN CO.**, Cleveland, Ohio, has been opened in Norfolk, Virginia, it was announced by A. D. Duncan, vice president.

The warehouse will serve the Tidewater section of Virginia, north as far as Williamsburg and west to Emporia, as well as the eastern section of North Carolina.

THE NIAGARA ALKALI CO., 60 E. 42nd St., New York, N. Y., has announced the construction at Niagara Falls, New York, of a new plant for the production of trichlorethylene, a chlorinated solvent widely used in industry as a degreasing and metal cleansing agent. The plant is expected to be in operation early this year.

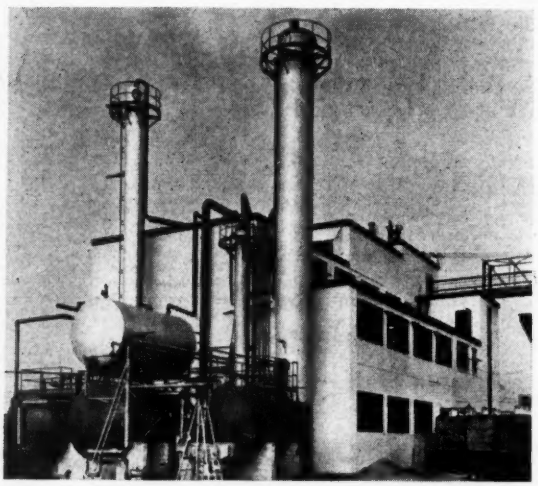
According to J. C. Cassidy, president of the company, the manufacture and sale of trichlorethylene is in line with the company's program to provide greater diversification of its chemical products.

The new, modern plant of the **ADVANCE PAINT CO.**, Indianapolis, Ind., has been recently placed into production. The company specializes in industrial coatings and finishes, including enamels, lacquers, varnishes, stains, fillers, and so on.

This plant consists of a main building which is a four-story and basement plant containing 125,000 square feet of floor space, a new two-story varnish plant with 10,000 square feet of floor space, and two raw material warehouses. New equipment now in use for the production of this company's products has resulted in greatly increased output.

Everything is handled mechanically. Pumps by the dozens are used to transfer materials to mixing and blending tanks through meters or weigh tanks.

Mile upon mile of piping is used as well as hundreds of valves to control the rapid and efficient movement of liquids. These liquids range from solvents and thinners to viscous lacquers, process oils, varnish paints, and other products.



Niagara Alkali Company's new chlorine products building now nearing completion at Niagara Falls. It is designed for production of NIALK Trichlorethylene.

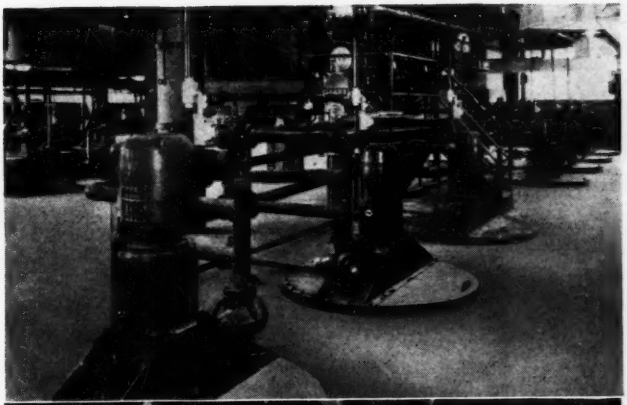


Fig. 1—In the lacquer department of the Advance Paint Company's new plant, material is drawn into blenders and mixers by a gravity process governed by a central control system.

Fig. 2—Berylite mills in the enamel department are used for grinding, and the milled materials are mixed with liquids in large vats under agitation.

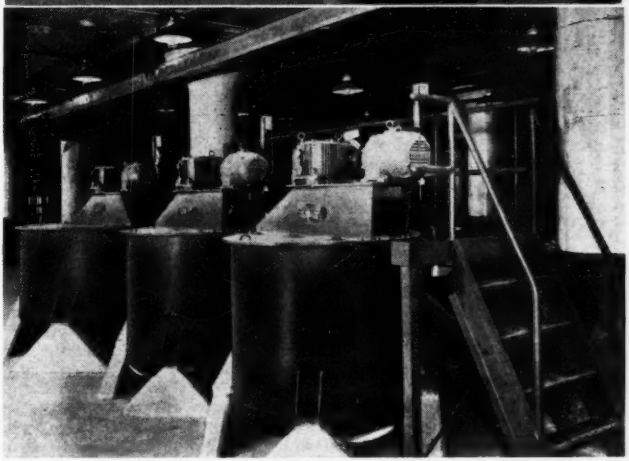


Fig. 3—Pigment stains are mixed in these large blenders. Basic materials used in the manufacture of pigment stains are prepared in the enamel department on the floor above and are drawn from overhead tanks.

(*Left to Right*) L. Y. Pulliam, vice president in charge of Durkee Famous Foods Division; Paul E. Sprague, vice president and director; Ralph G. Golseth, vice president in charge of Soya Products Division (Chicago); and J. P. Ruth, vice president in charge of Chemical and Pigment Division

A large, modern laboratory maintains control of all materials used in production. All initial formulations are made up and tested in this laboratory. In addition, departmental laboratories control every batch produced in various departments. Every batch is sampled, tested, and compared with the initial formulation before shipment.

In brief, that's the story of the new two-million-dollar plant of the Advance Paint Company located at 601 Kentucky Avenue, Indianapolis, Indiana.

COMPANIES

The formation of a New Product Development Department was announced recently by the **AMERICAN CYANAMID CO.**, New York 20, N. Y. George W. Russell, as manager of this department, will report directly to the company's vice president in charge of research and development.

One of the functions of the new department will be to determine whether there are economic uses for selected products which have been developed in Cyanamid's research laboratories, for which sales applications are not yet established. At present, most of the group's activity will be devoted to the evaluation of organic nitrogen compounds, although eventually the entire range of American Cyanamid's products will be included.

Production costs and plant efficiency were the topics discussed by managers of all major divisions of **THE GLIDDEN COMPANY** at a recent manufacturing and research meeting in Cleveland.

An address by Adrian D. Joyce, Glidden founder and board chairman, opened the meeting. The executives discussed equipment, maintenance, personnel, materials handling, plant safety, plant protection, dust control, and other operational problems.

Among those participating in the discussions, in addition to the vice presidents of the company, were: G. M. Halsey, manager, Chemical and Pigment Division, Baltimore; E. P. Palmer, general superintendent, Metals Refining Division, Hammond, Ind.; E. T. Wilhelm, plant superintendent, Soya Products Division, Chicago; L. S. Spielman, general superintendent, Food Divisions, Chicago; G. H. Mutersbaugh, general superintendent, Paint and Varnish Division, Cleveland; and W. D. Stallcup, manager, Naval Stores Division, Jacksonville, Fla.

Announcement has been made of the formation of the **MICHIGAN OVEN CO.**, 4544 Grand River Ave., Detroit 8, Mich., for the purpose of designing, fabricating, and distributing industrial ovens of all types for operating temperatures up to 1,100 degrees Fahrenheit.

Officers of the company, for many years prominent in the industrial oven field as former employees of Young Brothers Company, include: R. J. Ruff, president; E. C. Herrington, vice president and treasurer; and Paul A. Meyer, secretary.

NEW POSITIONS

The promotion of **DONALD G. FERRON** of the research staff in the chemical and color division has been announced by the Minnesota Mining & Manufacturing Co., St. Paul, Minnesota.

Mr. Ferron, a chemical engineer, will be chief process engineer and coordinator on the company's "Krox" color pigment project.

MINIT KOTE

CLEANS..NEUTRALIZES ..PHOSPHATIZES IN "60" SECONDS

- No Rinse Required
- Adaptable To All Washers
- Minimizes Maintenance
- Saves Time
- Saves Space

PRODUCES BETTER CLEANING—STRONGER PAINT BOND

Don't gamble paint performance over a metal surface that has been only cleaned. Follow the lead of other wise manufacturers (toys to automotive truck cabs) Phosphatize the surface with MINIT-KOTE, a new original product that cleans and provides a quality paint bond in one operation at a minimum cost. Write us your cleaning problems and ask for a KLEM Service Engineer to help you with the solution—No obligation.

BEFORE MINIT-KOTE

PHOTOMICROGRAPHS PROVE VALUE OF MINIT-KOTE

Photographs show a dirty, hot-rolled steel surface before and after a one minute wash with MINIT-KOTE at 165°F in a power washer 1% by volume concentration.

Neither paint nor primer will adhere to a dirty, oily or rusty surface. Thorough cleaning is not sufficient for a satisfactory job MINIT-KOTE cleans, removes light rust and forms an adherent phosphate coating on the cleaned surface in one economical operation. Write for descriptive literature

AFTER MINIT-KOTE

KLEM Chemicals Inc.

OFFICES IN PRINCIPAL CITIES

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M. H. CORBIN has been elected president of the Standard Varnish Works of New York and **E. E. DAY**, president of the Standard Varnish Works of Illinois, both men succeeding **J. HEATH WOOD**, who was elected chairman of both boards.

Mr. Corbin has been with the company for 11 years and a vice president and director for the last four years. After graduating from Lehigh University as a chemical engineer, Mr. Corbin held various important positions in the technical and sales branches of the paint and varnish industry and is the author of numerous articles on industrial finishes. He is a member of the Chemist Club, Advertising Club, Sales Executive Club, American Chemical Society, American Society for Testing Materials, and a Fellow of the American Institute of Chemists.

E. E. Day has been with the company since 1920 and has served as a vice president and director of the New York Corporation and executive vice president and director of the Illinois company. In addition to his industry interests, he is a member of the Chicago Athletic Association, Illinois Athletic Club, and the South Shore Country Club.

J. Heath Wood, who was elected chairman of the boards, has been president of the New York corporation for 18 years and the Illinois company for 24 years. He is widely known in the industry and has been very active in the affairs of the National Paint, Varnish and Lacquer Association, serving as vice president and on many committees. He began his paint career with the old Heath & Milligan Manufacturing Company.

Other new officers elected by the New York corporation are: **W. B. DAY**, chairman of the executive committee; **C. F. LESCH** and **H. H. RITTENHOUSE, JR.**, vice presidents; and in Illinois, **M. H. CORBIN, J. P. JORDAN**, and **A. J. KESTLY**, vice presidents; **I. A. COWEN**, secretary and treasurer. New directors are **CARL BAUER** of New York, and **M. H. CORBIN, A. D. ROBSON**, and **L. H. JENKINS** of the Illinois company. **A. D. ROBSON** was reelected vice president and **JAMES S. WOLF**, secretary-treasurer of the New York corporation. **J. R. STROHM** was reelected a director of the Illinois company.

I. N. KIMSEY has been named field sales manager of the Industrial Products Sales department of The B. F. Goodrich Co., Akron, Ohio, it has been announced by Chester F. Conner, department manager.

Mr. Kimsey has been manager of the Akron district for industrial products sales for the last 10 years. He joined the company as an industrial products salesman in 1922.

Mr. Kimsey's former post is taken by **JOHN M. COONEY**, who had been manager of the Boston district for industrial products sales for the last two years.

The Quaker Chemical Products Corp., Conshohocken, Pa., manufacturer of metal and textile processing chemicals, synthetic surface active agents, and resins, has announced the appointment of **W. J. HARING** as technical director.

Mr. Haring served as a research chemist at the W. H. Burns Company, chief chemist and plant manager with the A. C. Ferguson Company, and joined Quaker in June 1944 as plant supervisor, subsequently going into the control laboratory, research laboratory, and becoming director of metals research in 1945.

Mr. Haring is a member of the American Society for Metals, Franklin Institute, American Chemical Society, American Physical Society, American Association for the Advancement of Science, and wah elected to Phi Lambda Upsilon.

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In soluble oil solutions . . . grinding solutions . . . wash and rinse tanks . . . those points in your production cycle where rust actually starts . . . we recommend Rustex No. 2. Sample or further facts sent upon request.

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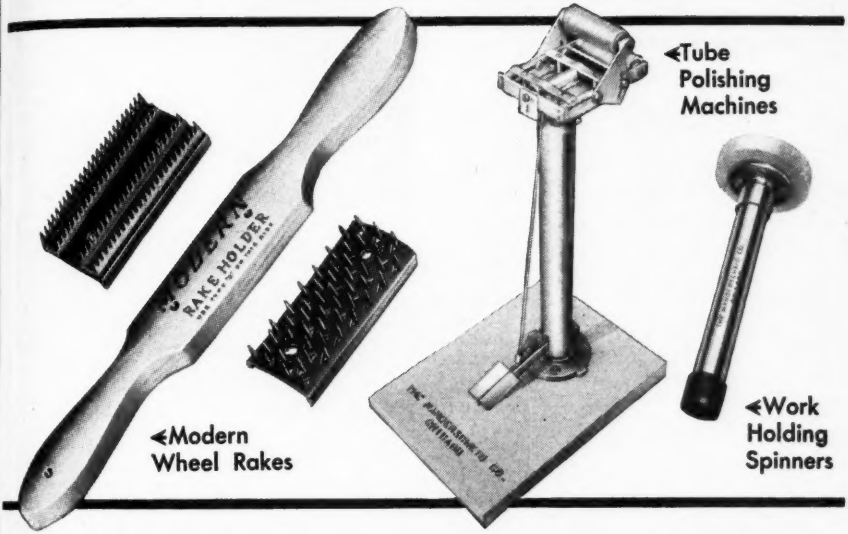
RAKES . . . SPINNERS . . . TUBE POLISHING MACHINES



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You'll find this modern wheel rake safe, fast and economical. It will recondition and shape polishing wheels and buffs with a minimum loss of material and without hazard. Write for complete details and prices.

Tube Polishing Machines Improve Workmanship

Rubber rolls tapered against each other drive tubing across face of polishing wheel or abrasive belt. Tube machine produces a uniform finish, free from spiraling. It polishes tubes from ¾" to 5" in diameter.

Work Holding Spinners For Uniform High Speed Polishing and Buffing

Here's a spinner for holding work and producing uniform high speed polishing and buffing. It has totally enclosed grease packed ball bearing construction. Removable fixture flange has machined face and screw holes for attaching wood block or other fixtures. Write for complete literature and price quotation.

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• METAL FINISHING SUPPLIES AND EQUIPMENT •

The appointment of **JOE STONEKING** as advertising and sales promotional manager has been announced by N. W. Embry, president of The General Box Co., 510 N. Dearborn Ave., Chicago 10, Ill., manufacturer of shipping boxes and crates. Mr. Stoneking's background consists of 16 years in the industrial and sales promotional fields.

According to Robert C. Stanley, chairman of the board of directors of The International Nickel Company of Canada, Limited, the following executive rearrangements have been made in the company:

DR. JOHN F. THOMPSON, executive vice president since 1936 and a director and member of the Executive Committee since 1931, has become president. **DR. PAUL D. MERICA,** vice president since 1936 and a director, has become executive vice president. **HENRY S. WINGATE,** secretary since 1939 and a director, has become a vice president and continues as secretary.

According to an announcement by O. J. S. deBrun, president of The Egyptian Lacquer Manufacturing Co., South Kearny, N. J., **NILS BOLIN** has been appointed plant manager of the new Egyptian Lacquer Manufacturing plant to be located in Lafayette, Indiana. **E. B. BRADSHAW,** former purchasing agent, has been appointed divisional manager of the Lafayette Division.

E. B. Bradshaw (left), Nils Bolin

Melville Morris

Optimus Equipment Co., Matawan, N. J., has announced the appointment of **MELVILLE MORRIS** as executive vice president and member of the board of directors. This appointment follows the recent merger of the Midwestern Manufacturing Company of New York with the Optimus Equipment Company, a subsidiary of the Hanson-Van Winkle-Munning Company.

In line with the enlarged scope of operations, Mr. Morris announces the appointment of **A. OTTO MILLEN** as Middle West district supervisor and the L. G. Evans Company as representative for Illinois, Indiana, and Wisconsin.

DONALD W. GRAHAM has been appointed district sales manager of the Heavy Chemicals Division of the Pennsylvania Salt Manufacturing Company in charge of the Cincinnati sales office, it has been announced by R. S. Roeller, sales manager of the division.

Mr. Graham, who has been in charge of Pennsalt's St. Louis office for several years, succeeds C. W. Dermitt who resigned this month. Temporarily, Mr. Graham will combine his duties at Cincinnati and St. Louis.

Appointment of **JOSEPH SHRAWDER, JR.,** as assistant director of sales of the Pigments Department has been announced by E. I. du Pont de Nemours & Co., Wilmington 98, Del. Mr. Shrawder has been manager of technical sales in the department.

At the same time, **ROBERT H. POHL,** sales promotion manager for pigment colors, was named to succeed him as manager of technical sales; **JACK B. CALLOWAY,** division head of the color sales service laboratory, was appointed to the sales promotion manager post; and **WILLARD F. SPENGEMAN** became division head of the color sales service laboratory.

Now **PRECISION CONTROL of ALL ESSENTIAL TEMPERATURES for IDEAL SPRAY FINISHING**

. . . Under Heat

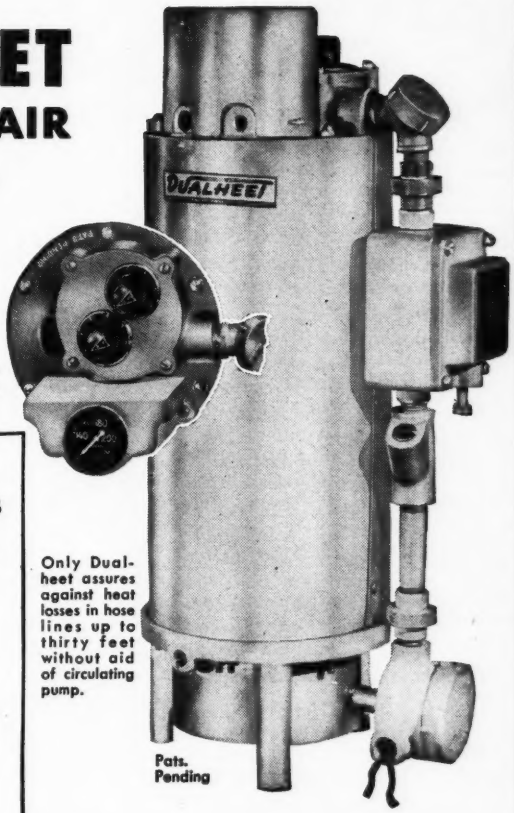
The

DUALHEET

PAINT and AIR HEATER

Guarantees Greatest Efficiency with Substantially Lowered Production Finishing Costs.

...ESPECIALLY RECOMMENDED FOR LACQUER SPRAYING.



Only Dualheet assures against heat losses in hose lines up to thirty feet without aid of circulating pump.

Pats. Pending

BECK Finishing Shop Necessities

- TRIANOL PAINT STRIPPER
- TRIALKLENE ALKALINE CLEANERS
- TRIDRAW DRAWING COMPOUNDS
- TRIPREP RUST PROOFING OILS
- TRICOAT VINYL BOOTH COATING
- TRIALENE HAND SOAP (Liquid)

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BECK EQUIPMENT CO.

CLEVELAND 2, OHIO

(Left to right): Ian L. Carmichael, Charles M. Dunn, Jr., Henry D. Coulton.

IAN L. CARMICHAEL has been named national accounts department manager for the Glidden Company's Paint and Varnish Division, according to an announcement by A. D. Duncan, vice president. In his new capacity Mr. Carmichael will coordinate the sales of paints and varnishes to national concerns.

A graduate of Colgate University in 1936, Mr. Carmichael was associated with the General Electric Company until 1940, when he joined the Gillmore Carmichael Olson Company. During the war he served in the Navy, and after being discharged as a lieutenant formed his own business, Pallet Systems, Inc. He was president of the company until his appointment to his present position with Glidden.

According to a recent announcement, **JAMES D. RUSSELL** has been advanced to sales manager and **LEONARD R. SHOREK** to chief engineer of the Young Brothers Co., Detroit, Mich., manufacturer of industrial ovens for paint and varnish baking, lithographing, metal decorating, chemical drying, textile, rubber, and other processing.

Both Mr. Russell and Mr. Shorek have been associated with the company for several years.

A. D. Duncan has announced the appointment of **HENRY D. COULTON** as sales manager of the company's Eastern Direct Sales Division, Reading, Pennsylvania.

Mr. Coulton joined The Glidden Company soon after his graduation from Princeton University in 1934. Before joining the Navy in 1941, he served as assistant manager of retail stores and as assistant to the manager of industrial and transportation sales.

Upon his return to Glidden after the war, he assumed the duties of assistant sales manager of the company's Nubian Division in Chicago.

In his new capacity Mr. Coulton will be responsible for Eastern Division industrial sales.

Appointment of **CHARLES M. DUNN, JR.**, as assistant manager of The Glidden Company's direct sales department in Cleveland was announced recently. Mr. Dunn will continue as director of the technical service department in Cleveland, a position he has held for more than a year.

Mr. Dunn joined Glidden as a technical correspondent in the industrial sales division soon after his graduation from Case Institute of Technology in 1939. After service in the Air Forces during the war, he returned to Glidden as assistant manager of aviation sales and was promoted to manager in 1946. His appointment as director of the Cleveland technical service department was made in September 1947.

JAMES W. RAYNOLDS, former vice president and director of the Sun Chemical Company of New York, has joined the General Electric Company's Chemical Department as sales manager of silicone products, according to a recent announcement by John A. Zellhoefer, Chemicals Division sales manager. With headquarters at Waterford, New York, Mr. Raynolds will have commercial responsibility for G-E silicone gum, oils, emulsions, greases, resins, and water repellents.

J. B. Willis, service manager for the Pemco Corp., Baltimore, Md., has announced that **GEORGE MARTIN** and **ALLEN P. WHERRY** have joined the Pemco Service Department.

Simultaneously with Mr. Willis' announcement, H. C. Craven, plant manager, announced that **GEORGE G. UPDIKE**, formerly associated with the Porcelain Products Corp., Carey, Ohio, has accepted a position with Pemco and has been assigned to the control laboratory.

MEMO { ***On a better way to handle chrome plating solutions***

With this "outside heater" setup you can put all the advantages of the new Durco heat exchanger to work for you:

1. CORROSION RESISTANCE – Made of Duriron. Completely resistant to practically all plating solutions. Years of successful application throughout the plating industry.

2. NO DILUTION of solution.

3. EXCEPTIONALLY HIGH K VALUES obtained by a design that fully utilizes the pressure drop to break down fluid film.

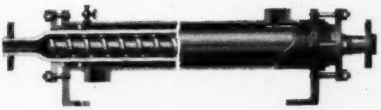
4. COMPLETE FLEXIBILITY OF INSTALLATION. Can be installed horizontally, vertically, near ceiling, on next floor or in next room.

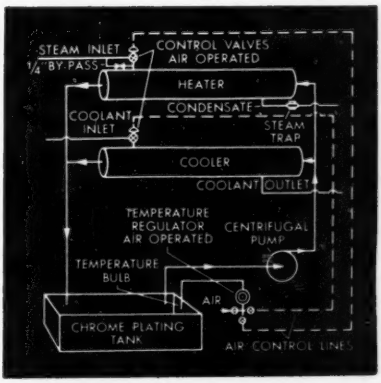
5. NO PACKING AGAINST THE CORROSIVE SOLUTION.

6. MAINTENANCE—May be opened for inspection or cleaning without emptying tanks or shutting down.

Complete heat exchanger units including pump, pipe, fittings and valves mounted on single frame, are available.

For details, send coupon.





A sketch of a typical chrome plating installation showing use of Durco Heat Exchangers.

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CORROSION RESISTING ALLOYS & EQUIPMENT

THE DURIRON COMPANY, INC.
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Gentlemen:
Please send me, without obligation, your bulletin 1603A on Durco heat exchangers for plating applications.

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Company_____
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Durco Adv. 83-GM

Joseph F. Calabrese

Announcement has been made of the appointment of **JOSEPH S. CALABRESE** as a salesman for Special Chemicals Corp., 30 Irving Pl., New York 3, N. Y. He will cover the State of New Jersey.

Mr. Calabrese formerly had his own electroplating business where he specialized in copper, nickel, brass, and many other electroplated finishes. His father is Dan Calabrese, a well known member of the Newark Branch of the American Electroplaters' Society.

C. W. Haynes Laboratories, Inc., Springfield, Mass., manufacturer of lacquers, stains, varnishes, and synthetics, announces that **GEORGE MORROW** has joined the sales staff, covering the southern Connecticut territory. Mr. Morrow, formerly a member of the Egyptian Lacquer Manufacturing Company sales staff, will be remembered by American Electroplaters' Society members by reason of his demonstrations as a magician at various A.E.S. conventions.

CHESTER F. CONNER has been appointed manager of the Industrial Products Sales department of the Industrial and General Products Division of The B. F. Goodrich Co., Akron, Ohio, according to an announcement by E. F. Tomlinson, division general manager.

Mr. Conner has been with the company 39 years, all in the industrial products sales field. He started in 1910 as a sales correspondent. Transferred to the Boston district in 1916, he became assistant district manager there in 1920, held that post three years, and then returned to principal headquarters in Akron in the sales promotion department.

Named manager of sales promotion for industrial products in 1932, Mr. Conner has held other managerial posts, including manager of distributors sales and merchandise manager for industrial products.

An authority on industrial rubber products, Mr. Conner served on the advisory staff of the rubber director's office in Washington during World War II, and has been prominent for many years in mill supply organizations.

JOHN N. BRICKMAN, formerly field engineer for the Norton Co., Worcester, Mass., has been appointed abrasive engineer in an additional territory recently created in the City of Chicago.

John Black, president of Circo Products Co., Cleveland, Ohio, announces the appointment of **NORMAN J. LEARY** as manager of Industrial Sales and Service. This follows an expansion program of Circo in the industrial field, which has been made possible by the addition of a new plant.

According to an announcement by G. B. Work, general sales manager for the Zapon Industrial Finishes of the Atlas Powder Company, **R. T. RIGGS** has been appointed to the position of sales manager for the North Chicago, Illinois plant.

R. T. Riggs

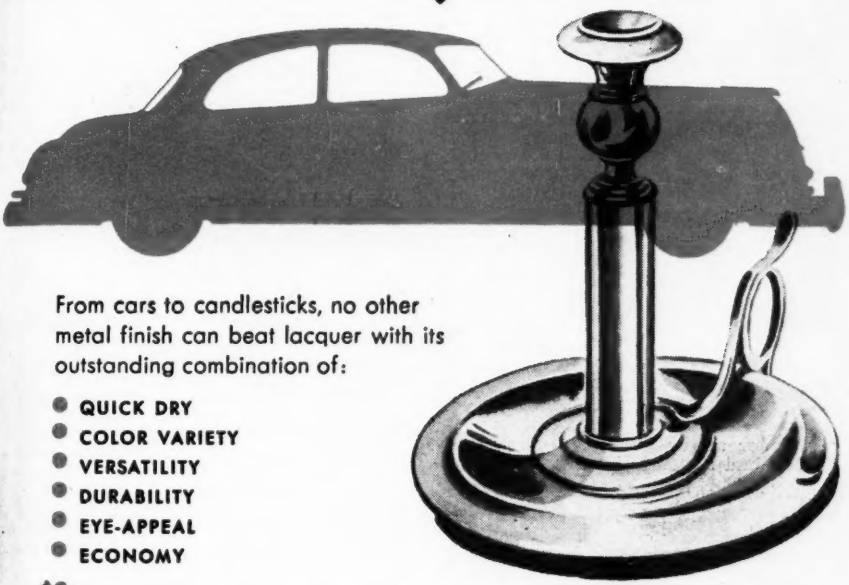
Mr. Riggs was with the Standard Varnish Company for nine years, five of which were spent as general sales manager in New York City. He then was a sales supervisor with the Pittsburgh Plate Glass Company, operating in the Midwest territory for fifteen years.

HONORS

The Eagle Printing Ink Co., Division of Sun Chemical Corporation, recently honored **ANDREW J. TRY,** Chicago branch manager, at a dinner commemorating the 38th anniversary of his association with the organization.

Besides receiving two matched pieces

LACQUER



From cars to candlesticks, no other metal finish can beat lacquer with its outstanding combination of:

- QUICK DRY
- COLOR VARIETY
- VERSATILITY
- DURABILITY
- EYE-APPEAL
- ECONOMY

HERCULES POWDER COMPANY
INCORPORATED
927 King Street, Wilmington 99, Del.

IS BEST!

Hercules does not manufacture lacquers, only the basic materials from which they are made

CL9-5

of luggage, Mr. Try was presented with a gold watch as a token of appreciation for his long service and splendid record with the corporation.

HENRY J. KINGSBURY, chief engineer of Hammond Machinery Builders, Inc., Kalamazoo, Mich., has entered partial retirement after 50 years of service with the company.

Henry J. Kingsbury

He has in his half century of service had much to do with placing his company's products in the forefront of the polishing, buffing, and deburring fields through the development of a wide line of grinders, lathes and automatics, employing both wheels and abrasive belts.

His co-workers and friends pay him the tribute of never having heard him utter an unkind word nor of ever having had anyone question his word.

LEONARD T. BEALE, president of the Pennsylvania Salt Manufacturing Company, is one of eight employees in the Philadelphia office and the Whitemarsh laboratory who has been honored with a pin denoting 20 years of service with the chemical company.

Besides Mr. Beale, those receiving 20-year pins were **A. E. GAYDOS** and **WALKER PENFIELD,** assistants to the vice president in charge of manufacturing; **ERWIN C. ADAMS,** accounting department; **T. BAYARD GRACE,** purchasing department; **ALLEN E. MILLER,** division purchasing agent; **WILLIAM SAGERS,** maintenance engineer at the company's Whitemarsh Research Laboratories; and **COOPER HOLMES,** electrician at Whitemarsh.

Fifteen-year men honored were **SYDNEY L. W. LEA,** manager of advertising; **HENRY G. MEYER,** assistant production manager, manufacturing department; **GEORGE W. BENBURY,** manager, packaging and labeling division; **MARY G. KANE,** secretary to the general purchasing agent; and **MELVIN C. HILLWERTH,** accounting department.

VINCENT A. CURLL, technical advisor, special chemicals division; **ARTHUR BIXBY,** assistant sales manager, agricultural chemicals division; **ALBERT H. CLEM,** field sales supervisor, special chemicals division; **DR. JOHN F. GALL,** supervisor of research; **ROBERT G. DANEHOWER,** chemical engineer; and **NORMAN D. PESCHKO,** research chemist, all received pins for 10 years' service.

After receiving his own award from Y. F. Hardcastle, vice president in charge of manufacturing, who has been with Pennsalt for 40 years, Mr. Beale presented service pins to the other recipients.

MEETINGS

The 14th annual technical session and banquet of the **BOSTON BRANCH** of the **A.E.S.** will be held at the Hotel Statler, Boston, Mass., Saturday, April 16.

The program will begin at 1:45 P. M. and will include the following: "Tin Plate," a technicolor movie illustrating operations at the Weirton Steel Co., Weirton, W. Va.; "Disposal of Plating Room Wastes," by Dr. Fred Gurnham, consulting engineer and chairman, Department of Chemical Engineering, Tufts College, Medford, Mass.; "Leveling of Electrodeposits," by Myron B. Diggin, technical director, Hanson-Van Winkle-Munning Co., Matawan, N. J.; and "Outline of Simplified Plating Controls," by R. O. Hull, president, R. O. Hull, Inc., Cleveland, Ohio.

Following the program will be the banquet with a floor show and dancing.

"Plating as a Business" is to be a principal theme of the educational sessions of the **AMERICAN ELECTROPLATERS' SOCIETY NATIONAL CONVENTION,** to be held at Hotel Schroeder in Milwaukee, Wisconsin, June 27 to June 30, 1949.

Leslie Diveley, chairman of the educational and technical sessions, has stated that in the light of changing economic and market conditions a series of talks on the business aspects of electroplating will be of immediate interest to all those

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directly and indirectly connected with the finishing of metals. This series is planned to include a statement by a competent authority on the present attitude of the customer toward plated products, as well as a number of informative talks on the availability of plating materials.

In the past, the educational and technical sessions of the Society have been devoted almost entirely to new techniques and applications of electroplating and allied processes. Although this practice will be continued at the 1949 Convention, the program will be expanded to include recognition of the economics of the industry.

The **INDIANAPOLIS BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** will hold its annual educational meeting at the Indianapolis Athletic Club in April 9, 1949. The educational session will begin at 1:00 p. m. On the program are the following speakers:

Frank K. Savage, vice president, Graham, Crowley & Assoc., Inc.; J. D. Patrick, Westinghouse Electric Corporation; and G. A. Lux, Oakite Products, Inc.

The evening program includes a banquet, floor show, and dance.

SOCIETIES

At the annual meeting of **THE ALUMINUM ASSOCIATION** held recently in New York, R. S. Reynolds, Jr., of the Reynolds Metals Co., Richmond, Va., was elected president for the ensuing year. The following were elected vice presidents: E. G. Grundstrom, Advance Aluminum Castings Corp., Chicago; M. E. Rosenthal, United Smelting and Aluminum Co., Inc., New Haven, Conn.; and George N. Wright, The John Harsch Bronze and Foundry Co., Cleveland. A. V. Davis, Aluminum Company of America, New York, was re-elected chairman of the board, and Donald M. White was reappointed secretary and treasurer.

Three directors-at-large were elected to serve for three-year terms: Frank B. Cuff, Aluminum Company of America, New York; R. G. Farrell, New York, Fairmont (W. Va.) Aluminum Company, who has just completed two terms as president of the Association; and W. A. Singer, Apex Smelting Co., Chicago.

Member companies of The Aluminum Association account for all the primary aluminum production in the United States and about 85 per cent of aluminum semi-fabricated products.

The **RESEARCH COMMITTEE** of the **AMERICAN ELECTROPLATERS' SOCIETY** recently reported a discovery concerning the porosity of nickel.

The Research Directing Committee (W. M. Tucker, Eastman Kodak Co., chairman) reported that the porosity of electroplated nickel foil varies with the crystal structure of the deposit. Since it has been generally conceded that wrought foils are less porous than similar electrodeposited foils from commercial baths, this discovery may well prove to be the cornerstone for improving the corrosion resistance of nickel electrodeposits. Future researches on this subject will determine if nickel baths operating under commercial conditions can be modified to give a crystal structure with an improved corrosion resistance. Dr. N. Thon of Princeton University is conducting work on this project entitled "Nature and Effect of Porosity on Electrodeposits."

At a special dinner meeting held on Saturday, February 19, a permanent charter was presented to the **LOUISVILLE BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** by William J. Neill, A.E.S. second vice president.

The meeting was well attended by Louisville electroplaters, and visitors from the Cincinnati and Indianapolis Branches. Guests included Ed. Bruck, Indianapolis Branch president, and Donald L. Patrick, an organizer and former president of the Louisville Branch.

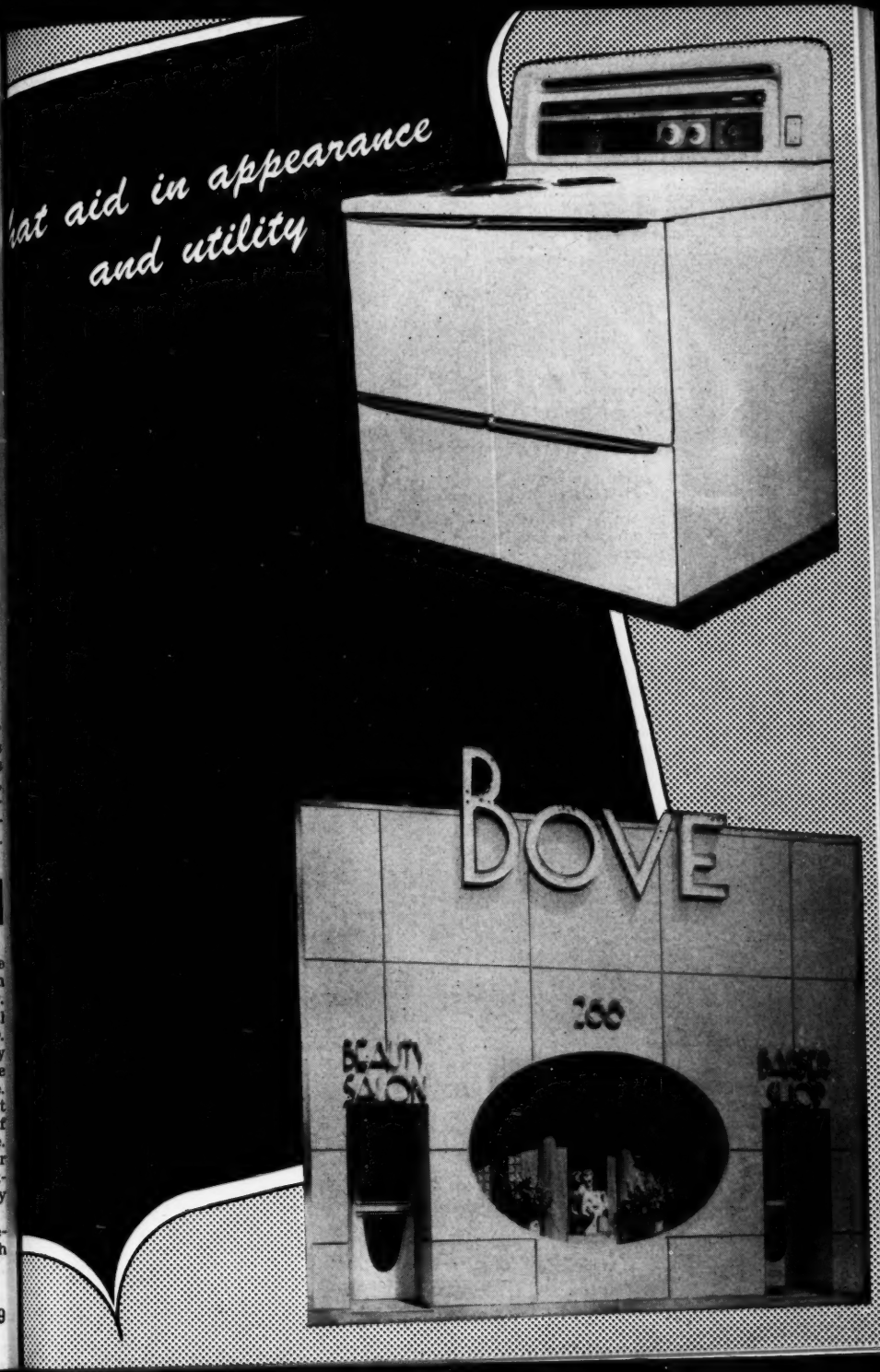
NECROLOGY

R. H. HORSBURGH, 65, retired vice chairman of the board of The Glidden Company, died of a heart attack recently.

Mr. Horsburgh was one of the original group of associates who aided Adrian D. Joyce in founding The Glidden Company in 1917 and he played a major part in the growth of the company to its present size.

Mr. Horsburgh had been in retirement since last November, and at the time of his death was planning a trip to Europe. He had continued to serve as a director of the company, however, and had attended Glidden's annual meeting the day before his death.

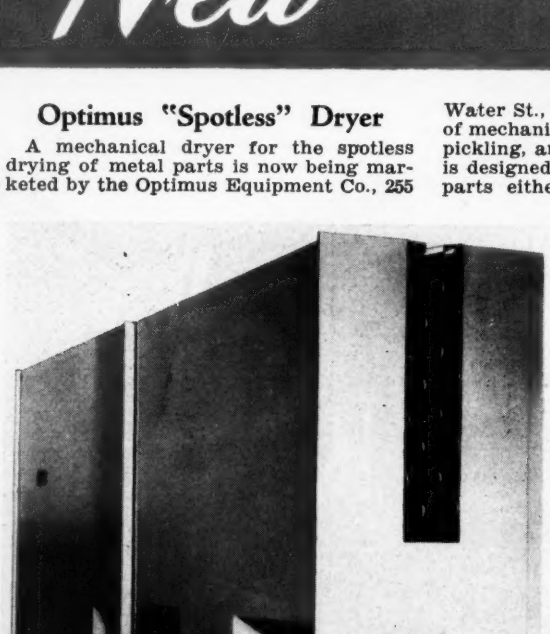
Mr. Horsburgh's career spanned a period of 50 years, during most of which he was a prominent industrial leader.


at aid in appearance
and utility
BOVE
BEAUTY
SALON

New • EQUIPMENT • MATERIALS • PROCESSES

Optimus "Spotless" Dryer

A mechanical dryer for the spotless drying of metal parts is now being marketed by the Optimus Equipment Co., 255 Water St., Matawan, N J., manufacturer of mechanical metal washing, degreasing, pickling, and drying equipment. The unit is designed to handle the drying of metal parts either on racks or monorail on a continuous production basis and is said to provide spotless drying after plating or polishing and before subsequent plating or lacquering.



Optimus "Spotless" Dryer

High velocity jet nozzles, which are directional and adjustable, are specially designed and located to reduce drying time to a minimum. Combinations of cold and hot air drying are employed. The cold blast removes water by mechanical action, leaving a film which is removed by the hot air blast which follows. Provisions are made to recirculate all possible heated air.

The Optimus "Spotless" Dryer is said to require a minimum of floor space, and fans, heating units, and motors are all located within the framework. Where overhead space permits, these units may be suspended from the ceiling. All auxiliaries are easily accessible for periodic inspection and maintenance.

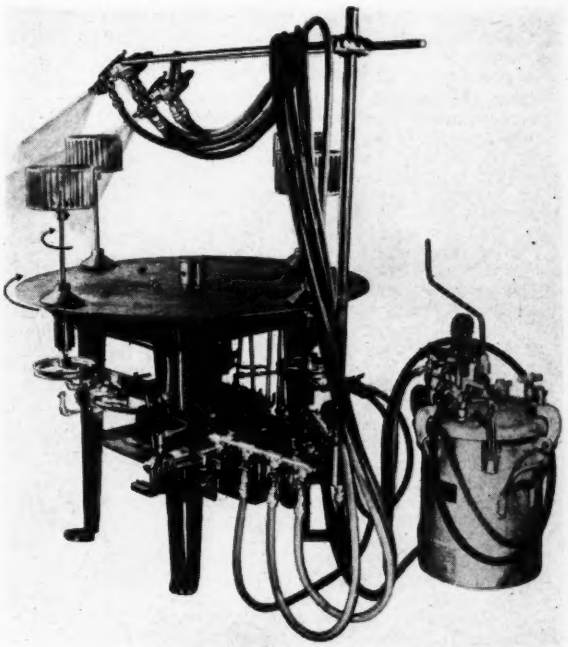
Automatic Pneumatic Spraying Machine

A fully automatic portable spraying machine designed for operation by one operator and activated solely by air pressure has been developed by J. Holland & Sons, Inc., 276 S. Ninth St., Brooklyn 11, N. Y. The machine is said to require no special exhaust system but can be installed in any spray booth large enough to accommodate the unit.

Objects to be finished are placed on the spindles of the automatic machine. The turntable upon which the spindles are mounted automatically indexes, carrying the objects to be sprayed directly under the spray guns which are mounted on the spray gun post. When the objects traverse to a point directly below the spray guns, an air motor is engaged, causing the spindles to rotate. At the same time, an air piston automatically opens the spray gun, or guns, so that paint may be sprayed for the desired length of time. At the end of the spraying cycle, the spray gun, or guns, are shut off and the turntable indexes again. The air motor is disengaged until the next part to be sprayed is indexed into the spraying position. Then the above cycle is repeated. The operator is needed only to load unfinished work and remove finished work.

Any number of spray guns up to four may be suspended from the spray gun post and prepositioned for most efficient and satisfactory spraying. The manufacturer claims that the sturdy construction of the machine assures accurate reproducible film thickness. Further, it is stated that adjustments for length of spraying time, speed of rotation of turntable and spindles can be made easily by means of a relatively simple screw adjustment.

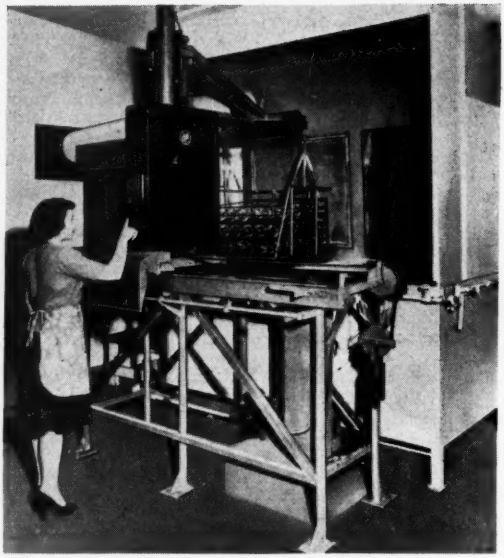
Various models of the automatic pneumatic spraying machine are available (AP-4, AP-8, and AP-12), providing spindles from 4 to 12 in number with a corresponding optimum capacity varying from 600 to 1,000 pieces per hour. The largest allowable diameter of parts to be sprayed on the machine varies from 23 inches for Model AP-4 to 8 inches for Model AP-12. The machine is designed so that the turntable is mounted 28 inches from the floor and measures 36 inches in diameter. The clearance between the spray gun post and the rotating spindles is 12 inches. All models of the machine are said to operate satisfactorily when an air pressure of 70 lb. per square inch or more is available.



Automatic Pneumatic Spraying Machine

Wiesner-Rapp Automatic Dipping Machine

A new automatic dipping and agitating machine has been announced by The Wiesner-Rapp Co., Inc., 1600 Seneca St., Buffalo 10, N. Y. This machine is designed for application in industries requiring consecutive dipping and controlled agitating operations. Greatly increased produc-



Wiesner-Rapp Automatic Dipping Machine

tion and quality of production are said to be assured by the elimination of supervision by operators, practically complete elimination of handling, and uniform processing of product.

When the load is placed in the container or holder and the "start" button pushed, the load is automatically conveyed to the first tank, dipped, and agitated for a predetermined time interval. This interval is quickly and easily changed for various operations. Then the loaded container or holder is automatically lifted and moved to the second tank and again dipped and agitated for a predetermined time interval. The machine then either returns the load to the first tank or moves it to a third one if the process requires more than two tanks. The entire cycle continues until the number of cycles is completed as preset on the built-in counter, at which time the load is automatically returned to the starting position and the machine is ready for reloading. The operator may also push the "stop" button at any time during the cycle. This action will return the load to the starting position after the dipping and agitating is completed.

The manufacturer claims that an unlimited number of tanks may be arranged within the cycles of this automatic machine. Also unlimited are the automatic time intervals of immersion and agitating at each tank as well as the number of travels between tanks.

The Wiesner-Rapp Dipping Machine may be operated automatically, semi-automatically, or manually. An "emergency" button is provided so that the machine may be stopped instantly at any time during any cycle. To resume the cycle, the "start" button must be pressed.

The Wiesner-Rapp Automatic Dipping Machine is available with or without tanks and can be furnished ready for installation over present tanks.

"Karbate" Heat Exchanger, Series 70A

Recently announced by National Carbon Company, Inc., 30 E. 42nd St., New York 17, N. Y., is the "Karbate" Seven-Tube Impervious Graphite Shell and Tube Heat Exchanger, Series 70A, as a redesign of the previous Series 70. The basic elements of the new unit may be converted from a single pass to a double pass unit by a simple change of covers. The exchanger can better be adjusted to varying rates of flow and amounts of liquid handled, and this feature gives the unit added utility without affecting its original efficiency, it is claimed.

Replacement of tubes may now be made quickly and easily in the field, thus eliminating the necessity of blocking off tubes and thereby reducing capacity. Two sizes, having effective outside tube areas of 16.4 and 24.6 square feet, are available.

Ertel Model EUS Filter

Ertel Engineering Corp., Kingston 3, N. Y., has announced the development of a new filter unit in which all parts coming in contact with the liquid are made from stainless steel. Designated as Model EUS, the new filter is equipped with stainless steel pump and stainless steel

In 80 seconds washer tubs come clean prior to enameling ... with PENNSALT METAL CLEANERS

When a huge press throws a 1000 ton punch into 18 gauge steel, it really pounds the drawing compound into the steel surface. In other words, a tough cleaning job pops up.

Yet 80 seconds' spray treatment with Pennsalt Cleaner solutions enables Heintz Mfg. Company to dig that soil out . . . leaving these home washer tubs clean and ready for the pickling and porcelain enameling operations.

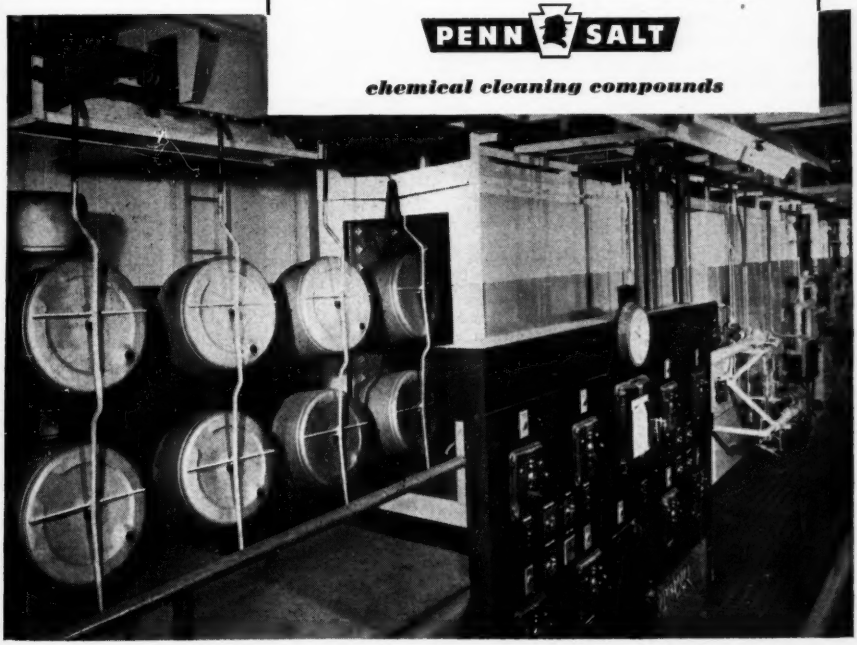
In this method, Pennsalt EC-12* and Pennsalt* 30 have done such a fast, efficient job that Heintz has had no cleaning rejects since the installation was made.

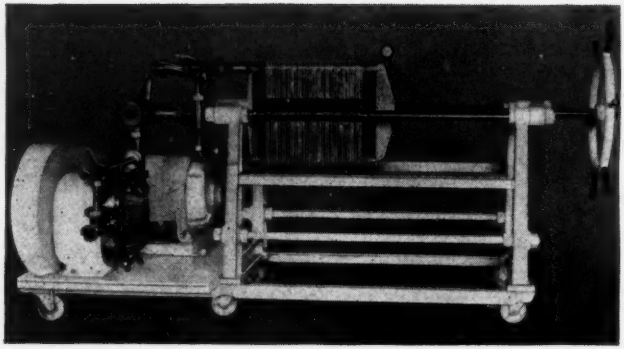
Satisfactory cleaning like this is being enjoyed all over the country by plants using Pennsalt Cleaners. Call in your Pennsalt representative, he'll be glad to discuss with you savings of time and money with Pennsalt's complete line of metal cleaners. Special Chemicals Division, Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.

*REG. U. S. PAT. OFF.

PENN SALT

chemical cleaning compounds





Ertel Model EUS Filter

fittings. Liquid clarity may be checked visually by means of a sight glass.

Closing the Model EUS is effected by a single Ertel handwheel. A stainless steel drip pan is provided so that valuable liquids may be saved. A pressure gage indicates working pressure at all times and a pressure relief safety valve is standard equipment.

The Model EUS Filter is available in sizes which accommodate from 10 to 100 Ertel low iron and calcium asbestos filter sheets, filter paper, or filter cloth. Capacities range from 5 to 30 g.p.m.

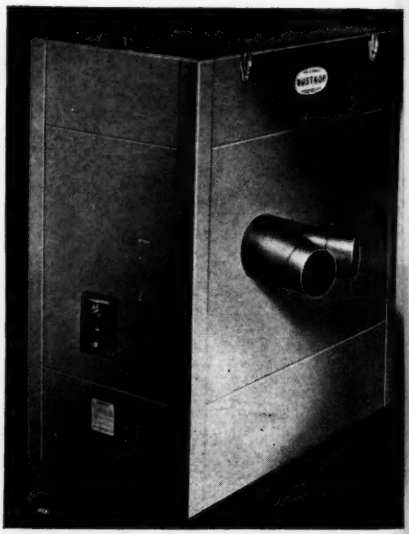
Easy mobility is said to be assured by six casters. The combination of polished stainless steel and white enamel provides this filter with a pleasing appearance and makes it adaptable for use in all sanitary production lines.

"Dustkop" Model 800 Dust Collector

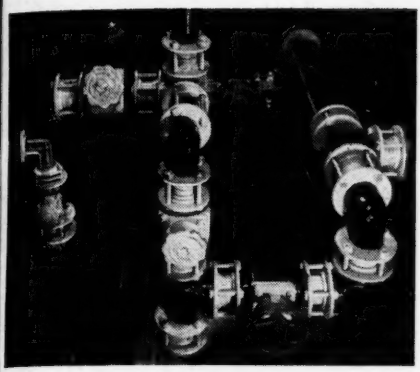
Designed and built especially to collect dust, dirt, and lint from medium duty, medium size grinding, buffing, polishing operations, and shavings and sawdust from middle sized belt and disc sanders, the Model 800 Dustkop has been added to its line of unit type industrial dust collectors by the Aget-Detroit Co., 340 Main at Washington, Ann Arbor, Michigan.

Except for size and capacity, the new Model 800 is identical with previous Models 1150 and 420 in that it is entirely self-contained, portable, and may be installed without wall or floor cutting or duct work. It develops a rated 746 c.f.m. at 8,000 f.p.m. velocity, with 3.7 inch water lift, and employs the same principle of operation as its predecessors. A paddle wheel, self-clearing fan, direct driven by a continuous duty ¾ h.p. 3,600 r.p.m. motor, creates the suction to remove the dust from the source. A cyclone separator, self-contained within the unit, removes the majority of the dust and dirt from the air stream, allowing only the fine dusts to be trapped by the spun glass filter which forms the top of the unit and comprises a second stage cleaning for the air before it is recirculated to the working space.

Dust and drit removed from the air stream in the cyclone are deposited in the removable drawer of the dust collecting bin which forms the base of the unit. The fine dusts which are removed by the



"Dustkop" Model 800 Dust Collector



Now you can FORGET ABOUT Corrosion

on . . .

- PIPE, VALVES
- FUME DUCTS
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- BLOWERS
- FITTINGS
- TOWERS
- PIPING
- PUMPS
- TANKS

Make your process equipment of HAVEG—and you can forget about corrosion! HAVEG is a different molded structural material that resists chemical action *through its entire mass.* Not just a lining or coating, its utility is not affected by surface gouges and abrasion. Moreover, HAVEG is strong. It resists shock. And it is remarkably easy to machine!

Standard items such as pipe, fittings, etc. can be shipped to you right from stock... specially designed and built tanks, and other "custom-built" equipment, will be delivered in just 4 weeks or less! So get your order in today—or write for the engineering bulletin F-5, today.

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Delaware 7-6266	Cherry 7297	Hartford 64250	Jackson 2-6065	Madison 1575	Mutual 8955	Elliot 0890

non-infammable spun glass filter are quickly shaken out of the filter by a hand crank. On average installations, shakedown of the filter is required infrequently. Renewal of the filter is claimed to be required at only prolonged intervals and is quick and low in cost.

Compactness (20 x 30-inch floor space x 30-inch height) permits the unit to be installed immediately behind or close to the source of the dust. Installation requires no wall, floor, or roof cutting.

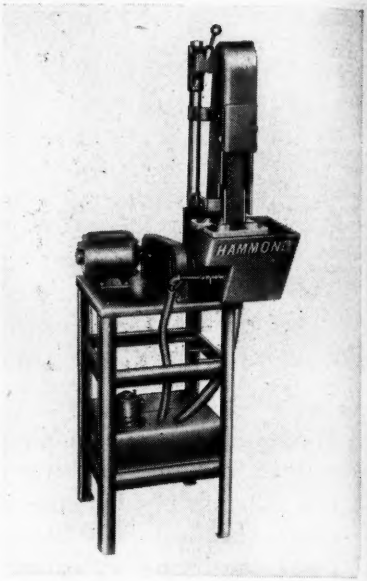
Interconnection of the starting circuit of the dust collector with that of the dust creating equipment is recommended so that dust collector and dust source are started and stopped simultaneously.

Suction of 746 c.f.m. developed by the ¾ h.p., 3,600 r.p.m. motor permits the use of the Model 800 with double end tool grinders with wheels up to 10-inch diameters, with polishers and buffers, belt and disc sanders using wheels up to approximately 8 inches in diameter. Actual sizes vary and should, of course, be analyzed individually.

Hammond New Model V-2WP Wet-N-Dri Flexible Belt Grinder

Product of Hammond Machinery Builders, Inc., Dept. GP-25, Kalamazoo 54, Mich., a Wet-N-Dri Flexible Belt Grinder designated as Model V-2WP has been designed especially for wet deburring and finishing of plastics. The machine is said to be suitable also for deburring, grinding, polishing, shaping, chamfering of ceramics, metal, rubber, wood, and other materials. Advantages claimed for the belt grinder are those obtainable in free belt, contour or platen finishing.

The Model V-2WP Wet-N-Dri Flexible Belt Grinder illustrated is fitted with a self-contained tank and pump unit. The same machine is available for direct connection to a water main. The machine may be used dry for certain applications. Abrasive belts up to 2½ inches wide may be used on the Model V-2WP grinder.



Hammond New Model V-2WP Wet-N-Dri Flexible Belt Grinder

Dualheet Paint and Air Heater

Designed to be used in connection with the hot spray painting process, the Dual-

WOOD TANKS for Plating and Pickling

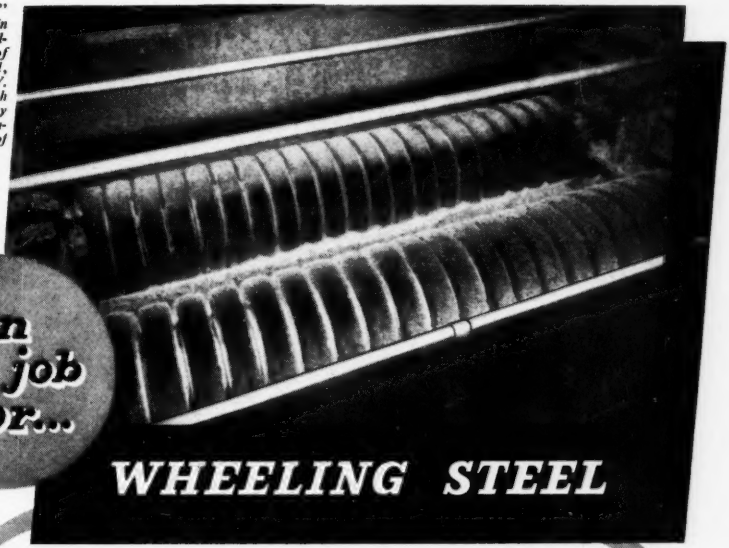
Excellent Service on all types of wood tanks for any purpose. Built to your specifications by one of America's oldest tank specialists.

Ask for estimates and suggestions.

KALAMAZOO TANK & SILO CO. • **Kalamazoo 16, Mich.**

"PITTSBURGH" Power Driven BRUSHES

A "Pittsburgh" power-driven brush in operation at the Steelcrete Division of Wheeling Steel, Beach Bottom, W. Va. This special brush is on the job every day deburring and cleaning large sheets of Expanded Metal.



On the job for... WHEELING STEEL

Pittsburgh's ingenuity in designing special brushes for unusual jobs is sought time and time again by leading firms in almost every industry. Wheeling Steel, for example, recently put its brushing problem before Pittsburgh's staff of skilled brush engineers.

Selecting a .014 steel wire with pre-tested fast cutting qualities, Pittsburgh engineers designed and built a *Perfect Balance* rotary brush that could take a beating and come right back for more. The brush was *stiff* enough to remove stubborn burrs. It was *tough* enough to penetrate and thoroughly clean the metal. And it was *soft* enough not to impair surface texture.

The brush did the job right from the first day it was put into operation—another example of Pittsburgh's ability to cope with the most difficult brush problems.

There's a "Pittsburgh" Brush for Every Industrial Use!

- GLASS
- STEEL
- PLASTICS
- AUTOMOBILE
- RUBBER
- PAPER
- TIRE and RETREADING
- SHOE MANUFACTURING and REPAIRING

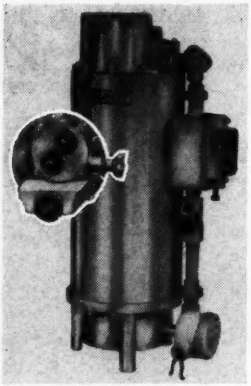
In the complete Pittsburgh line are brushes of all types, including "Perfect Balance" sections, wheels and assemblies. Consult the Pittsburgh engineering representative. He will gladly work with you in developing any type of power-driven brushes to meet your particular finishing specifications.

Phone or write Pittsburgh Plate Glass Company, Brush Division, 3221 Frederick Ave., Baltimore—29, Maryland

Power Driven BRUSHES

BRUSHES · PAINT · GLASS · CHEMICALS · PLASTICS

PITTSBURGH PLATE GLASS COMPANY



Dualheet Paint and Air Heater

heet Paint and Air Heater has been announced by The Beck Equipment Co., 10118 Detroit Ave., Cleveland 2, Ohio.

The manufacturer claims that an improved control of both paint and air temperature secured through the use of the Dualheet unit makes possible an improvement in the hot spray process. It is pointed out by the manufacturer that by warming paint and thereby reducing its spraying viscosity the thinner normally used for this purpose and subsequently lost by evaporation is not needed and its cost is saved. Another advantage claimed to be inherent in the hot spray process is that a thicker coat of paint may be applied with fewer passes of the spray gun. Sags and runs usually encountered in heavy coats of paint are said to be prevented by the high viscosity of the paint.

The Dualheet Paint and Air Heater is constructed of sturdy cast aluminum, contains an explosion-proof wiring compartment in the bottom of the unit, convenient well-designed controls, and all necessary safety accessories.

Self-Contained Cadet Buffer-Polisher

To serve all types of industry with a low priced quality buffing and polishing machine, the Standard Electrical Tool Co., 2518 River Rd., Cincinnati 4, Ohio, has developed a self-contained belted motor driven Cadet Buffer-Polisher.

The ball bearing motor is mounted on an adjustable base inside the pedestal. Power is transmitted to the work spindle through a multiple V-belt drive. The ball bearings are said to be fully protected and give support to the heavy extended spindle.

As optional equipment, a shaft lock for use in changing wheels and a hand brake for quickly stopping the spindle are available.

The standard spindle speed is 2400 r.p.m., but any other single speed or two predetermined speeds are available.

Lacquer "Dimenso"

Lacquer "Dimenso," a lacquer designed to provide a hammered finish in two colors in one operation, is now available for use in product finishing, according to the manufacturer, The Sherwin-Williams Co., Cleveland 1, Ohio. A companion finish to S-W "Dimenso," a two-tone baked enamel, the lacquer has been designed primarily for use by manufacturers who do not have facilities for baking, and it is pointed out that the product affords such plants all the advantages provided to those using regular Dimenso with heat-drying methods.

Self-Contained Cadet Buffer-Polisher

RELIEF FROM RACK EXPENSE

Rack upkeep can assume large proportions and become a major cost item. A large portion of this rack expense can be avoided through the use of semi-permanent insulation such as BUNATOL No. 1000 Paste. This very thick and exceedingly tough coating will stand up for months and oftentimes last as long as the rack is to run. That makes a real saving in rack costs. No. 1000 Paste insulation is all solids and contains no evaporating liquids; no waste; no loss. Easy to handle and the cost per rack is much less because of less labor and time and much lower material cost. Just a quick oven bake and the heavy coating becomes a part of the rack with several times the wear life at less than half the cost. If you do not have an oven, our applicators can handle your racks. Write for information.

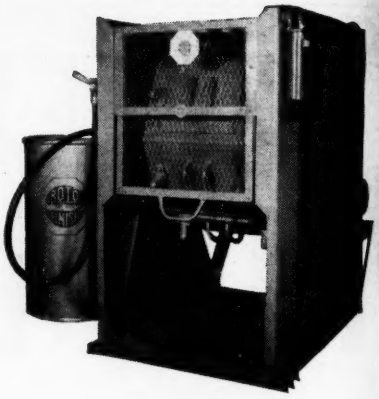
Nelson J. Quinn Company, Toledo 7, Ohio

Suitable for use on metal, plastic, or wood surfaces of products that will not be subjected to high temperatures in service, Lacquer Dimenso is packaged ready to use and is furnished in aluminized and regular Dimenso colors. It is appplied by spraying and is said to air-dry in approximately 20 minutes. In general, primers are considered desirable but are not necessary if the surface is properly cleaned.

8-Door Roto-Finish Machine

A new 8-door machine for finishing parts not adaptable to standard Roto-Finish processing methods by reason of size and shape has been announced by The Sturgis Products Co., Sturgis, Michigan.

Built as special equipment for individual requirements, the new 8-door machine is similar to the standard one-compartment Roto-Finish machine, except that each flat of the octagon cylinder is fitted with a large size door. Parts are rigidly fixtured to the back of each door so that surfaces to be finished are presented to the processing mass. Selective action caused by one-direction processing is overcome by reversing the cylinder.



8-Door Roto-Finish Machine

All regular Roto-Finish processes and materials can be used with the 8-door machine and the same quality finishes can be expected as with the standard Roto-Finish equipment.

Extra cam locks are fitted to each door to overcome added strain imposed by fixtures on the doors. Doors and fixture plates are interchangeable to handle a variety of different parts, all of which may be processed at one time. Doors may be obtained unlined or rubber-lined. Due to varying requirements, motor size varies with each application. Supplied with each machine is a magnetic brake, plus a forward and reversing switch. Automatic timer controls are optional. Cylinder shells are of extra heavy construction with seams welded both inside and out.

Chemlustre

Chemlustre, a new finish for aluminum, has been developed by Chemclean Products Corp., 64 Sixth Ave., New York 13, N. Y. This finish is recommended for the following purposes: as a dip to restore the bright appearance of badly weathered aluminum; to form a highly lustrous semi-satin finish on aluminum articles; as a surface smoothing dip prior to anodizing.

The material involved in the Chemlustre process is an alkaline combination, white and crystalline in appearance. It is used in ordinary steel equipment, preferably with an exhaust system similar to that used in chromium plating. For use,

POLISH
BURR
LAP
FINISH
CUT FINISHING COSTS 50% to 90% with
SCHAUER speed lathes
Users report: "We burr twice as many pieces per hour." "Speed Lathes cut polishing time in half!" Learn how you, too, can "Save with Schauer" on all your secondary finishing operations. Write for Catalog 480.
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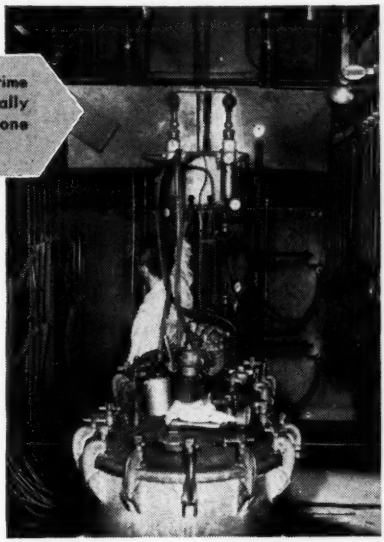
MODERNIZE WITH ELECTRO-SPRAY



Furniture parts receive both prime and finish coats electrostatically in this booth, attended by one operator.

$ Pulling $ DOLLARS $ out of the $ AIR...

Dollar-wise, or production-wise, when electrostatic forces *pull* the paint spray to the work, you gain many advantages over all other methods of spray painting.

For example, with Ransburg Electro-Spray you can save 40 to 60 cents out of every $1 you now spend for paint. You can *automatically* paint a variety of products on one line. Far fewer rejects and re-paints appear because the paint spray is attracted to exterior surfaces evenly and uniformly. And, you save valuable time and dollars now spent on booth clean-up.

Ask for literature or Ransburg's color movie and see for yourself why Ransburg Electro-Spray is worth a *thorough* investigation.

RANSBURG

RANSBURG ELECTRO-COATING CORP.

Indianapolis 7, Indiana

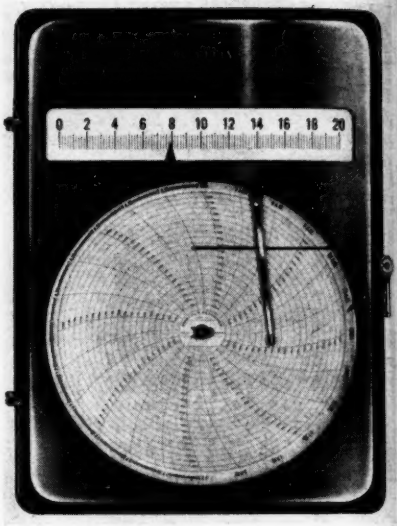
the material is dissolved in water at the rate of 2 to 4 lb. per gallon and the resulting solution heated to 160 to 180 deg. F. Work to be Lustreized is immersed from 15 seconds to 2 minutes in the Chemlustre solution, and then rinsed in cold running water. Any smut formed may be removed with either Chemclean No. 540 or 50-50 nitric acid at room temperature. The luster obtained will depend upon the alloy and the time of immersion.

Bristol Time-in-Process Recorder

Developed to chart the rate of conveyor movement in terms of total time, a time-in-process recording instrument has been announced by The Bristol Co., Waterbury 91, Connecticut.

Specifications for processing products through such processes as continuous metal annealing furnaces, continuous drying and baking ovens, and so on, are usually stated in terms of total time through the process. When a conventional tachometer is used to measure the speed of the conveyor and the work, the operator must convert revolutions per minute or feet per minute into total time and also take into consideration the length of the processing path.

The Bristol Time-in-Process Recorder makes possible direct readings of time in process and is said to make easier the problem of establishing the correct conveyor speed for a given process.



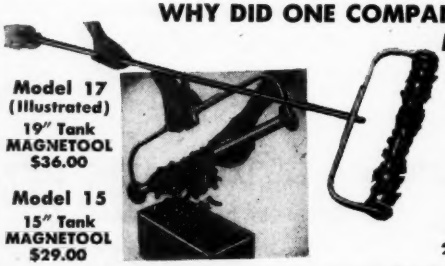
Bristol Time-in-Process Recorder

CycLon Series "NPC" Plastic Paint

A line of corrosion resistant plastic coatings developed especially for the finishing industry for the protection of machinery, processing equipment, and general factory maintenance where corrosives are used has been developed by The Poly-Cyclo Products Co., Cleveland, Ohio. The coating, termed CycLon Series "NPC," is an easily applied, high solids synthetic paint used for protecting metals, wood, and ceramic surfaces against chemical attack by corrosive fumes, condensates, spillage, and so on. CycLon is said to air dry quickly by solvent evaporation to an adhesive, hard wearing, flexible, glossy coating.

CycLon coatings are said to be unaffected by all alkalies, their salts, and by most mineral acids. In addition, CycLon

WHY DID ONE COMPANY ORDER 15 OF THESE TANK MAGNETS . . . *after trying one?*



Model 17
(Illustrated)
19" Tank
MAGNETOOL
$36.00

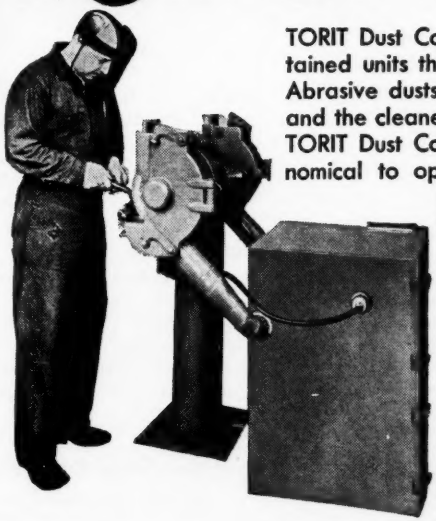
Model 15
15" Tank
MAGNETOOL
$29.00

A large eastern plating dep't ordered 15—and many other platers large and small (names on request) have ordered and reordered—because the Rotary Tank MAGNETOOL grabs the parts and not the tank. It unloads instantly, completely. Acid and alkali proof. NO WIRES. Non-electric. Permanent. 100% guaranteed. Entirely new principle—potent pending. Order direct on 10 day trial or write for Bulletin.

MULTIFINISH MANUFACTURING CO.
2112 Monroe, Dept. 491, Detroit 7, Mich.

Abrasive dusts irritate workmen and slow production. Eliminate them with

TORIT DUST COLLECTORS



TORIT Dust Collectors are completely self-contained units that are attached at the machine. Abrasive dusts pass through spark-proof filters and the cleaned air is recirculated.

TORIT Dust Collectors are easy to install, economical to operate, and may be moved as production layouts are changed. Sizes ranging from ⅓ HP to 3 HP, and fitting all standard grinding, cut-off and polishing wheels are available for immediate delivery. For details and latest TORIT catalog write:

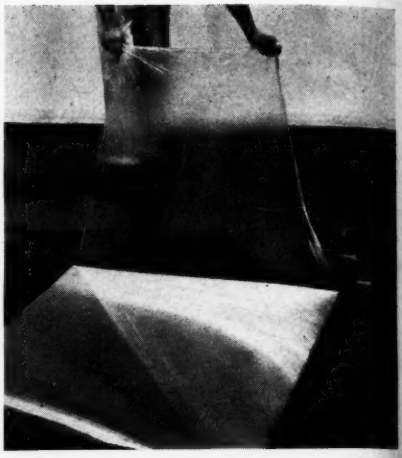
TORIT
MANUFACTURING CO.
314 WALNUT ST. • ST. PAUL 2, MINN.

films are inert to alcohols, soaps, water, oxidants, food and fruit acids, oils, aliphatic hydrocarbons, gasoline (low octane), and many other corrosive reagents, it is claimed. Non-oxidizing CycLon coatings are designed to maintain their flexibility over a wide range of temperature and are recommended for use at any temperature below 180 deg. Fahrenheit.

"3M" Strippable Coating

A removable protective coating which protects polished metal stock from die marks, scratches, and abrasion during cupping, forming, and drawing operations has been announced by the Minnesota Mining and Mfg. Co., St. Paul 6, Minn. Called "3M" Strippable Coating, it can be sprayed, brushed, or roll-coated on finished metal surfaces. It can be left in place from the mill to the point of sale, throughout fabrication, and can be hand-peeled in large sheets or blown off with compressed air, it is claimed.

The coating, available in a variety of colors, is applicable to glass and other non-porous materials as well as metals. It is a translucent film which is shock absorbent and abrasion resistant, with excellent resistance to water, gasoline and oil, according to the 3M company's laboratories.



"3M" Strippable Coating is readily removed from polished metal

Coverage is said to be 250 to 300 square feet per gallon for a one mil sprayed coating, which air dries in approximately three minutes or can be oven dried in less than a minute.

25% longer wearing than before . . .

Edmont

Gloves coated with

NEOX *plastic rubber*

All Styles Resilient neoprene, now combined with durable plastic, far outwears former Edmonts and has *several times* the life of ordinary gloves. Liquid-proof, snag-proof, with comfortable fabric lining.

TEST OFFER: See your glove supplier or write direct for test samples and prices, stating operation, materials handled, temperature conditions. Edmont Mfg. Co., 509 Orange St., Coshocton, Ohio.

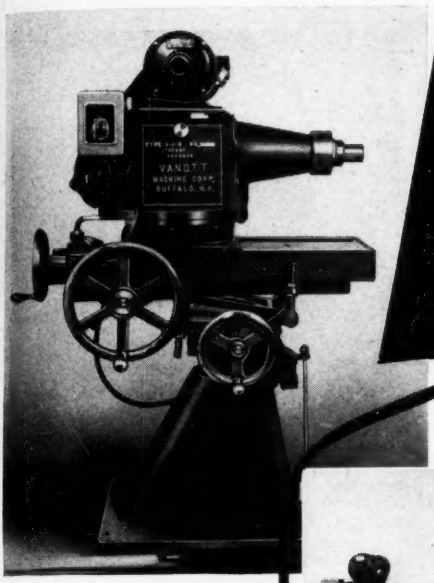
Quaker Strip 15

The new types of urea melamine, vinyl, and bis-phenol finishes of both the air dry and baked types can be stripped readily in less than five minutes' time without the use of an expensive and hazardous solvent or special equipment by using Quaker Strip 15, it has been announced by the manufacturer, Quaker Chemical Products Corp., Conshohocken, Pennsylvania.

Quaker Strip 15 is applicable to both the new and the old type finishes so that the necessity of maintaining a special stripping bath for either class of work is unnecessary, the manufacturer claims.

H-VW-M Water Soluble Tripoli

Designed to be used in buffing parts on which the buffing composition tends to pack and cause difficulty in the sub-



Use a VANOTT to

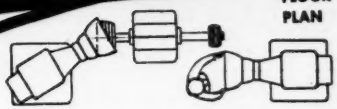
POLISH or BUFF

MORE UNIFORM QUALITY

REDUCED LABOR COST

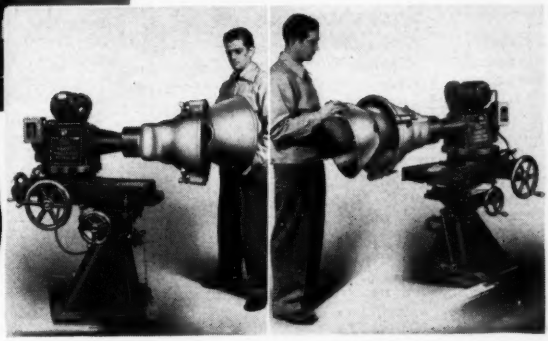
Here is an example

FLOOR PLAN



Above: - Vanott V-1 Standard Single Spindle Machine.

Right: - Chucks designed to hold these 18" dia. floodlight reflectors being manufactured by the General Electric Company of West Lynn, Mass. Buffs large end of ball in first operation, small end in second operation as shown on far right. The drawing illustrates how one operator handles two machines.



● VANOTT single spindle polishing and buffing machines are designed for maximum adaptability to increase your production and reduce labor costs in polishing products with either plane or curved surfaces.

All vital mechanisms are enclosed to protect them from abrasive wear.

The head is swivelled automatically by depressing a foot lever. Movements at right angles on the horizontal plane are accomplished by two hand wheels. Considerable vertical adjustment is possible.

The spindle speed is normally 24 RPM and can be set to stop automatically when the head swings away from the work. Automatic oscillating movement up to six inches aids in polishing.

Write for catalog showing our V-1 Machine, also our V-4 four spindle and V-8 eight spindle machines.

SEND SAMPLES or drawings of your work and we will estimate cost of machines and chucks to increase your production.

VANOTT

MACHINE CORPORATION

222 Colgate Avenue, Buffalo 20, New York

sequent cleaning operation, two water soluble tripoli compositions, 2-S-10 and 2-S-12, have been developed by the Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

Composition 2-S-10 is recommended for the heavier duty jobs where cutting properties are advantageous and of more importance than maximum solubility of the composition.

Composition 2-S-12 is said to be very dry and is recommended for use on filigreed work where subsequent cleaning constitutes a difficult problem and the cutting properties of the composition are secondary in importance.

Both water soluble tripoli compositions are claimed to have the advantages of stability and freedom from crumbling, as well as excellent performance properties.

"Spekaluminite"

Special Chemicals Corp., 30 Irving Place, New York, Y. Y., announces its improved "Spekaluminite," a protective and decorative aluminum finish designed to produce the luster and sheen of bright cadmium.

Applied by dipping or spraying and then baked, Spekaluminite is claimed to adhere perfectly to all metals and plastics, and will air-dry dust-free in five minutes. It possesses excellent rust and tarnish resistance and is guaranteed not to peel or flake.

Manhattan "Moldisc" Bonded Disc Wheel

Development of the Manhattan "Moldisc," a bonded disc wheel for rotary sanders, has been announced by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J. According to the manufacturer, the disc provides the fast free-cutting qualities necessary in fabricating stainless steel and other alloys which must be ground and finished without generating excessive heat. Other advantages which are claimed to be provided by the disc include unusually long life, uniform cutting action, maximum production, ease of handling, minimum operator fatigue, and maximum safety.

Manhattan "Moldisc" Bonded Disc Wheel in Use

The Manhattan Moldisc may be specified for roughing and fast metal removal, as well as for finishing operations. The disc is usually supplied as a 7-inch diameter ¼-inch thick unit with ⅞-inch hole and, for maximum efficiency, is recommended for operation at speeds up to 6,000 revolutions per minute.

New Process Glyceryl Mono-Oleates

Glyceryl Mono-Oleates are now being produced by a new process. This process is said to make possible the production of lighter colored and more highly surface active materials.

Two grades of the new Glyceryl Mono-Oleates are now being manufactured by Glyco Products Co., Inc., 26 Court St., Brooklyn, N. Y. One grade is water dispersible and soluble in alcohols and oils and is a powerful oil-in-water emulsifier. The other grade is insoluble in water and soluble in alcohols and oils.

"If you have an appearance measurement problem, describe it and send us specimens. We will be glad to examine and measure such specimens on the instruments we believe applicable to your problem. Write for latest brochure concerning new instruments for measuring appearance and other optical factors."

HENRY A. GARDNER LABORATORY, INC.
BETHESDA 14, MARYLAND

ANNOUNCING - - -

ANOTHER

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Bulk Chromium Plating Plant

AT STRATFORD, CONNECTICUT

CAPACITY—45 TONS per day

The installation of this modern and efficient processing plant here at Stratford, Connecticut, is ready to serve you economically and productively with a capacity of 45 tons of small parts per day on

Steel - Copper - Brass - Zinc Die Castings

Parts are burnished, copper plated, nickel plated and chromium plated, or plated to specification.

The MECHROME process produces a very highly polished luster finish economically. Most work leaves our plant within 48 hours after receipt. Pick-up and delivery service within 150 miles of Stratford.

Your inquiries are invited. Call, write or telephone. Send samples or blueprints to our main office at Ferry Boulevard and Longbrook Avenue, Stratford, Connecticut.

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BROOKLYN, N. Y.
BUFFALO, N. Y.
ST. LOUIS, MO.

• **SEND ALL INQUIRIES TO PARENT PLANT IN STRATFORD, CONNECTICUT** •

Roe Polishing Machine

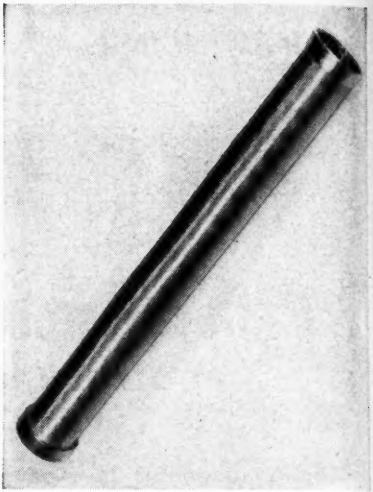
The Lewis Roe Manufacturing Co., 1050 DeKalb Ave., Brooklyn 21, N. Y., is now marketing a polishing machine which has been designed to replace heavier machines for light buffing and coloring work.

Driven by a ¼ h.p. a.c. or d.c. motor mounted on the stand, the unit is equipped with two self-aligning ball bearing pillow blocks and has a ⅝-inch diameter spindle 22 inches long. Longer spindles can be furnished if required. The spindles are turned down at the ends to ½-inch diameter and threaded eight square threads to the inch. The spindle is tapped for taper points which are furnished with the machine.

The Roe Polishing Machine is furnished with 8 feet of cord, a switch, a V-belt, and a device for keeping the belt at a uniform tension.

Titeflex Wire Mesh Membrane

A wire mesh membrane which can be used in any standard Titeflex filter has been developed by Titeflex, Inc., 422 Frelinghuysen Ave., Newark 4, N. J. Known as the Titeflex Wire Mesh Membrane, it is a cylinder constructed of Type 316 stainless steel Dutch weave wire cloth and supported on the inside by a $\frac{1}{16}$-inch thick perforated cylinder with a ring on each end to act as a bearing surface. Mesh of the standard membrane is 20x250, but can be furnished in any mesh required. All joints of the membrane are welded.



Titeflex Wire Mesh Membrane

The new wire mesh membrane can be used with either Filterbestos or diatomaceous earth as a filtering medium, and is interchangeable with the porous stone membranes in Titeflex filters. According to the manufacturer, it will successfully withstand high pressures and high temperatures. Because the unit can be used to filter any solution which does not attack Type 316 stainless steel, its range of applications is practically unlimited, it is claimed.

Metric Speedbake

Development of a speedbake synthetic which adheres tenaciously to highly polished brass, stainless steel, aluminum, and other surfaces which ordinarily resist adhesion of organic coatings has been announced by the Research Division, Metric Lacquer Manufacturing Co., Inc.,

BOOTHCOTE

cleans spray booths quickly, economically, safely!

Spray Boothcote on clean booth. Surplus paint can then be peeled off in sheets by any operator.

- Saves time and labor
- Time-tested; used for 11 years
- Mixed—ready to use

- Can be brushed or sprayed
- Non-inflammable; safe to store
- Does not flake off

Money back trial offer: 15 gals. $16.50 f.o.b. Buffalo or write for Circular.

Distributors! Write for open territories.

HYGRADE FOOD PRODUCTS CORP.

Boothcote Div., 19 Stetson St., Buffalo 6, N. Y.

719 PAINT FINISHERS ..... *Can't Be Wrong!*

THAT'S THE NUMBER OF PLANTS THAT USED *Materials* FROM INDUSTRIAL CHEMICAL PRODUCTS COMPANY LAST YEAR . . . *To Clean and Prepare Metals for Painting!*

TRY SOL-KLEAN

Removes Oil and Rust . . . And Anchors Paint To Metal . . . .

Over 3,000,000 gallons used in the last 10 years . . . Etches metal and coats with phosphate . . . Non-inflammable . . . Economical (dilute one volume of SOL-KLEAN with 3 volumes of water) . . . Apply by brush or dipping—wiped or washed off!

INDUSTRIAL CHEMICAL PRODUCTS COMPANY

3778 BELLEVUE AVENUE **DETROIT 7, MICH.**

Representatives In Principal Mid-Western Cities

In Canada made and sold by Boyle Chemicals Ltd., Windsor, Ont.

62 Woolsey St., Irvington 11, N. J. Tests conducted on polished brass, for example, show that this new decorative coating withstands a 28-inch Gardner impact test and a 180 deg. bend over a ⅛-inch mandrel without cracking or flaking. Similar results have been demonstrated on stainless steel and aluminum test panels.

The manufacturer claims that in addition to the to the high adhesion value of the new flexible synthetic, a hard, smooth, and uniform surface is achieved, having high resistance to chemicals and solvents and remarkable resistance to abrasion. Metric Speedbake is now being produced in all colors, prepared specifically for spray application. Variations which will permit dipping and roller coating methods are also available.

PRODUCT LITERATURE

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

"Questions and Answers on Vapor Degreasers" is the title of a booklet now being distributed by the Phillips Manufacturing Co., 3438 Touhy Ave., Chicago 45, Illinois.

"Durobrite" Zinc Plating Process, to be used wherever zinc is required for rustproofing and specification plating, is thoroughly discussed in **Sodium Products Bulletin 8-1047,** now being distributed by the Electrochemicals Dept., E. I. du Pont de Nemours & Co., Wilmington 98, Delaware.

The Bullard-Dunn Process, the electrochemical descaling of metals, is fully discussed in an eight-page bulletin now available from the Bullard-Dunn Process Division, The Bullard Company, Bridgeport 2, Connecticut.

Den-Nex Hand Cleaning Compound. Instructions for using Den-Nex, a hand cleaning compound containing lanolin, for removing paint, lacquer, varnish, and similar materials are given in a four-page pocket-size pamphlet distributed by the Dennis Chemical Co., 2701 Papin St., St. Louis 3, Missouri.

Acitrol No. 100 Pickling Inhibitor is discussed in a four-page illustrated bulletin issued by E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. The advantages obtainable from the use of Acitrol No. 100 in the pickling of steel are outlined and further illustrated by means of charts and photographs.

Henry A. Gardner Laboratory, Inc., Bethesda 14, Md., has published a six-page bulletin describing its **Circular Drying Time Recorder** for measuring the drying characteristics of paints, varnishes, enamels, drying oils, lacquers, shellacs, adhesives, and various other types of coatings.

Corrosion by Concentration Cells. Reasons for galvanic cell corrosion, as well as methods for helping to overcome it, are contained in a new booklet issued by The International Nickel Co. Inc., Corrosion Engineering Section, 67 Wall St., New York 5, N. Y. The booklet is complete in all engineering details and includes drawings and other essential illustrative material. Its 7½ pages are designed to provide the production man as well as the engineer with brief but informative material, based on more than 40 years of study into this and other phases of corrosion.

START with a K-P Belt for a FAST FINISH

Korb-Pettit Spiral Woven Wire Conveyor Belts are fabricated in suitable metals and mesh sizes for baking, conditioning, heat treating, material-handling, processing and washing. Particularly well adapted to conditions where drainage and the free circulation of air are required. K-P Flextrough Belts with flanged edges prevent the escape of small parts. Side chains can be provided for sprocket drive.

K-P Spiral Woven Wire Conveyor Belts increase production and sting the maintenance bill at the same time because they are backed by superior engineering skill and the accumulated experience of many years.

Consult with the K-P district sales office or write direct. Korb-Pettit Wire Fabrics and Iron Works Inc., 1509 North Mascher Street, Philadelphia 22, Pa.

•

Korb-Pettit Spiral Woven Wire Conveyor Belts

"Keeps Promises"

Wire mesh, Spiral Woven Wire Conveyor Belts, Infra-Red Conveyor Dryers, Leather Finishing and Drying Machines, Complete Special Purpose Conveyors designed and Manufactured to Order.

Polishing and Plating Equipment. A folder illustrating and describing polishing and electroplating equipment and supplies is available from J. Holland & Sons, Inc., 276 S. 9th St., Brooklyn, New York.

Drew Metal Cleaners A and B, anhydrous heavy duty and medium duty high pH alkali detergents, are discussed in a four-page leaflet available from E. F. Drew & Co., Inc., 15 E. 26th St., New York 10, New York.

"Physical Removal of Impurities from Plating Solutions," an eight-page reprint published by the Darco Corp., 60 E. 42nd St., New York 17, N. Y., is a discussion dealing with the removal of impurities from electroplating solutions by physical means, as distinguished from purification by chemical means.

Bulletin No. CZ-2, published by the Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa., describes its Chemgard translucent plastic aprons and sleeves for protection against chemicals, greases, dirt, and solvents in the processing industries, industrial plants, mills, and shops.

The Stanley Chemical Co., East Berlin, Conn., has issued data sheets on its **Stantite Spraying Primer No. 66R-3157A,** a new type rust-inhibiting primer and preparation coating designed for use under either air-dried or baked finishes. Characteristics, application, cost, and performance of the primer are presented.

BERKS REFINING
Company
Save money on your degreasing solvents by having BERKS REFINING COMPANY rerefine your used solvents. No shipping problem for you. We pick up your used solvents and return them to you. Ask for price.
Write P. O. Box 52, Pottstown, Pa.
Phone: Birdsboro 2-2956.

Sauereisen Acid-Proof Cements are described and actual applications in the field are pictured in a six-page bulletin announced by the Sauereisen Cements Co., Sharpsburg Station, Pittsburgh 15, Pennsylvania.

Torit Catalog No 34. Published by the Torit Manufacturing Co., 314 Walnut St., St. Paul 2, Minn., this catalog outlines methods for collecting and cleaning dust-laden air from around industrial machines and includes complete information on the Torit line of self-contained and cyclone type dust collectors. Also described are recent improvements made in certain models and accessories.

KP Catalog No. 40, available from Korb-Pettit Wire Fabrics & Iron Works, Inc., 1509 N. Mascher St., Philadelphia 22, Pa., discusses the company's line of industrial wire partitions and machine and window guards in all standard meshes and wires. Illustrated throughout, the catalog includes complete specifications of each product, together with general data required for ordering.

Data Bulletin 7C describing Bryant Pow-R-Semblies—packaged industrial gas burner assemblies complete with pressure blowers—is available on request to the Bryant Heater Co., Industrial Division, 1020 London Rd., Cleveland 10, Ohio. Capacities, specifications, dimensions, and alternative assemblies are described for the units, which are applicable to boilers, air heaters, dryers, kilns, ovens, and other equipment to which open burners with controlled flames are suitable. Size range is 400,000 to 6,600,000 Btu/hr. output.

"Anhydrous Ferric Chloride," a simplified, concise manual on the properties, uses, and methods of handling ferric chloride, has been prepared by the Pennsylvania Salt Manufacturing Co., 1000 Widener Bldg., Philadelphia 7, Pa. The 12-page booklet lists and comments on the most important uses of ferric chloride, and contains information on Pennsalt's two commercial forms of the product, listing their characteristics and equipment recommended for their use.

IRIDITE

Iridite is quickly applied manually or automatically, to large or small parts

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HOT WATER TANKS

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LONGER LIFE

BETTER SERVICE

If your products use ZINC or CADMIUM in any form, you'll want to know about Iridite, the non-electric chemical coating that offers you 3-way protection—

- √ guards against corrosion on zinc or cadmium—lengthens product life.
- √ gives better paint adherence on zinc or cadmium—improves entire finishing system.
- √ brightens zinc or cadmium—keeps it bright and shining to help boost sales. Also available in colors.

Whatever your needs in finishing zinc or cadmium, there's an Iridite to do the job. Write today for FREE FOLDER and full information—or better still—send samples of your product for free treatment.

FREE!

Please send me illustrated folder and sample panels of Iridite.

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COMPANY.....

ADDRESS.....

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WEST COAST LICENSEE—L. H. BUTCHER CO., LOS ANGELES 23, CALIFORNIA

Harshaw Industrial Chemicals. The Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio, has published a 32-page book which alphabetically lists all chemicals available through Harshaw, relates the history of the company, and describes its major activities.

Iridite Olive Drab. A data sheet presenting complete operational information on Iridite Olive Drab for zinc or cadmium plated parts is available from Allied Research Products, Inc., 4004 E. Monument St., Baltimore 5, Maryland.

"Niel-Coat" P-110 Rust Preventative Coating and Primer. Preliminary data sheets describing Niel-Coat P-110, a rust preventative coating for rusted metal only, are available from Nielco Laboratories, Detroit 19, Michigan.

Refinishers' Price List No. 107. Rinshed-Mason Co., 5935-71 Milford, Detroit 10, Mich., has issued Refinishers' Price List No. 107 which lists and describes each item of its line of automotive undercoats and finishing materials so that the operator can determine what system and products are best suited to each job.

Chain Belt Bulletin 48-38, available from the Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis., describes and illustrates Rex Flat Spray Nozzles in service where water or liquid chemicals are used in cleaning, cooling, washing, and descaling operations. Tabular information concerning their discharge in gallons per minute, dimensions, materials, sizes and prices are also included in the bulletin.

GOLD PLATING SOLUTIONS

In All Colors

Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant

Proven Quality by the Acid Test

Write or call our experts about your plating problems

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5-0095

NEW BOOKS

"Effect of Impurities and Purification of Electroplating Solutions" is the title of A.E.S. Research Project No. 5, published by the American Electroplaters' Society, P. O. Box 168, Jenkintown, Pa. Price, 40 cents.

This eight-page booklet discusses some effects of copper in nickel plating solutions on the salt spray resistance of nickel and nickel-chromium deposits on steel.

Rhenium. By J. G. F. Druce. Published by The MacMillan Co., Cambridge University Press Dept., 60 Fifth Ave., New York 11, N. Y. Price, $2.50.

This book describes the properties of rhenium and shows how it is separated. Rhenium finds use as a catalyst, an alloying element, and in electroplating.

The book is divided into eight chapters as follows: Introduction; The Isolation and Properties of Rhenium; The Oxides of Rhenium; Perrhenic Acid and Its Salts; The Halogen Compounds of Rhenium; The Sulphides, Selenides and Thio-Salts of Rhenium; Some Organic Rhenium Derivatives; and Applications and Patents Relating to Rhenium.

Jewelers' Workshop Practices. By Leslie L. Linick. Published by Henry Paulson & Co., 131 S. Wabash Ave., Chicago 3, Ill. 530 pages. Price, 6.00.

"Jewelers' Workshop Practices" is, as the name implies, written in language easily followed by the layman, and further it is written more for the man who directs or does the work than for the scientist, chemist, or analyst.

The following subjects are discussed: Common and Technical Names of Chemicals; Kinks and Tricks of the Trade; Oddities; Elementary Metals; Alloys; Electroplating; Metallizing; Shop Practice; Shop Tools; Lacquers; Plastics; Enamels; Polishing and Buffing; Burnishing; Refining; Melting and Casting; Gems and Minerals; Proprietory Formulas; and Technical Tables.

Cut your Abrasive Costs with SILVER STREAK belts

AP Engineers licked this 3-way sanding problem — finishing stainless steel carving knives with cocobolo wood handles and brass rivets. Jewel Silver Streak cloth belts, grit No. 80, outperformed all other abrasives on this job.

Silver Streak belts, insulated to withstand terrific grinding heats, will speed up your surfacing jobs. If you have a sanding problem, write Abrasive Products, Inc., 555 Pearl St., South Braintree 85, Mass.

Abrasive Products, Inc.

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There's a JEWEL ABRASIVE for Every Polishing and Finishing Need

BELTS
DISKS
SHEETS
SPECIAL SHAPES
Cloth, Paper, Fibre or Combination Backing

BUY THROUGH YOUR INDUSTRIAL DISTRIBUTOR

The world's largest supersonic wind tunnel, capable of producing winds of about 1,500 miles per hour, has been unveiled in Cleveland by the National Advisory Committee for Aeronautics. Including motors, controls, and switchgear, it was designed and built by General Electric.

Features of the tunnel are an axial-flow air compressor with over a thousand blades; the most mechanical power ever placed on a single shaft by electric motor drive and the largest slip-regulators yet devised.

Speed of the winds through the tunnel's 6 x 8-foot test section is regulated by a pliable sheet of stainless steel that forms part of the entrance to the tunnel. This sheet is positioned by means of hydraulic rams that adjust it to varying curvatures to narrow or widen the throat.

Wind is created by the air compressor when it is driven by three 29,000 h.p. electric motors hooked in tandem to a single drive shaft. The motors, which operate at 900 revolutions per minute, are the largest ever used in a wind tunnel installation.

The Finishing Touch — **By J. A. Patterson**

"Yes'm, it's very simple. We just dunk 'em in, jerk 'em out and they come out bright and shiney."

Opportunity Section

FOR SALE: 2 Hammond 10 HP buffing lathes, brand new, never used, double spindle, heavy duty, 220V, 3 phase, push button, complete with controls. ALSO: 1 Divine 6 unit type, straight line automatic polishing and buffing machine, including 6-7½ HP units, with conveyor, drive, belt, and all motors, starters and applicators, 220V, 3 phase, 60 cycle, USED. Write Box No. 34, c/o PRODUCTS FINISHING. 431 Main Street, Cincinnati 2, Ohio.

FOREMAN (PLATING) Excellent opportunity with large New York City firm, long established and a leader in industry. Gold, chrome, nickel and rhodium experience on small metal parts essential, as well as ability to analyze solutions. Reply confidential —include full details of experience. Write Box No. 31, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

FOR SALE: 2,500 Safety Needle Point Tampico wheels. Never used, excellent for satinizing work on metal. 12" diameter, 1¼" hole, 20% off present market price. Ford Metal Moulding Co., 27-01 Bridge Plaza N., Long Island City, N. Y.

G. S. BLAKESLEE TRICHLORETHYLENE DEGREASER FOR SALE

Vapor type, heated by two 10 horsepower steam boilers with low pressure natural gas, cleaning capacity 1,500 lbs. of metal per hour, for conveyor operation, complete with 30 gallon still, opening for work 36" wide x 72" long, length 43', complete with recirculating pumps, solvent regenerating system. This machine purchased new from G. S. Blakeslee Company in 1946 and is now in operation, ready for immediate shipment and use. Reason for selling, changing type of cleaning operation. For full details call, wire, or write:

BRYANT HEATER
Division, Affiliated Gas Equipment, Inc.
Purchasing Department, Tyler, Texas

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MacDermid "Chrometex." A bulletin describing "Chrometex," a nickel activator used to increase the covering power of chrome, and its application is available from MacDermid Inc., Waterbury 88, Connecticut. Copy free upon request.

Bulletin No. D-491, graphically depicting seven actual installations of Sly Dust Collectors, is available from The W. W. Sly Manufacturing Co., 4700 Train Ave., Cleveland 2, Ohio. Copy free upon request.

Elliott Flexible Shafting. Catalog No. 49, containing 16 pages, offers complete data on the range of products available from the Elliott Manufacturing Co., 350 State St., Binghamton, N. Y. The use of Elliott shafting for power drives and remote controls, flexible shaft machines and accessories, monocoil for push-pull controls, and special flexible shaft machinery, as well as Elliott's engineering and design service, is described. Copy free upon request.

Despatch Finishing Equipment Bulletin 51. The Despatch Oven Co., 619 S. E. Eighth St., Minneapolis 14, Minn., now has available a 16-page two-color bulletin describing its line of gas-oil, electric, and steam ovens, dryers, air heaters, spray booths and flow coating, conveyors, metal cleaning and rust-proofing, air conditioning and make-up systems. Numerous illustrations and a case history complete the bulletin. Copy free upon request.

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CATALOGS

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Roxaprene

A brochure outlining detailed specifications for drying, application, adhesion, flexibility, resistance to chemicals, and other properties of Interchem Roxaprene Low Bake Finish has been issued by the Interchemical Corp., Newark 1, New Jersey.

2. Solvent Degreasing

A 16-page booklet which emphasizes fundamental practices for the economical use of degreasing solvents in metal cleaning departments of industrial plants has been published by the Detrex Corp., Detroit 32, Michigan.

3. Synthetic Resins

A 20-page technical booklet which includes a description of the properties and uses of all Hercules synthetic resins is now available from the Hercules Powder Co., Inc., Wilmington, Delaware.

4. Industrial Lacquers

A color card containing samples of the variety of colors of Pittsburgh industrial lacquers for wood and metal, together with suggestions for application of the lacquers, has been issued by the Pittsburgh Plate Glass Co., Industrial Paint Division, Pittsburgh, Pennsylvania.

5. Backstand Polishing

Case histories involving plants using the "3M Backstand Method" are discussed in a booklet being distributed by the Minnesota Mining & Manufacturing Co., St. Paul 6, Minnesota.

6. Zinc Fluoborate

Technical Information Manual ZF-1, containing extensive data on high speed, and tank and barrel plating with Zinc Fluoborate is being issued by the General Chemical Fluorine Division, New York 6, New York.

7. Polishing Wheels

Data on a wide variety of polishing wheels for all metals, as well as on abrasives, glue, and accessory products, are contained in a bulletin now being offered by the Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

8. Metal Cleaning Equipment

A folder telling how seven famous companies solved their production cleaning problems is now being issued by The Alvey-Ferguson Co., Cincinnati 9, Ohio.

9. Process Equipment

An eight-page general catalog issued by The Duriron Co., Inc., Dayton 1, Ohio, provides a brief description of a complete line of corrosion resisting equipment, including pumps, pipes, valves, heat exchangers, steam jets, and so on.

10. Surface Conditioning

Oakite CrysCoat Process, a precise surface-conditioning procedure for cleaning, rustproofing, and phosphatizing steel parts in one quick application, is the subject of a special service report released by Oakite Products, Inc., 32F Thames St., New York 6, New York.

11. Contact Wheels

A folder describing in detail the advantages of Jackson Buff Airway Contact Wheels is being offered by the Jackson Buff Corp., Long Island City 1, New York.

12. Corrosion Resistant Equipment

Haveg Corp., Newark 67, Del., has published Bulletin F-5 which illustrates by industrial application photographs and describes Haveg corrosion resistant equipment and its properties.

13. Clear Lacquers

A booklet describing six clear lacquers for metal and entitled, "Is There a Better Metal Finish Than the One You Now Use?", has been issued by The Egyptian Lacquer Manufacturing Co., Newark, New Jersey.

14. Buffs

A complete line of buffs for every buffing requirement, as well as polishing wheels and compositions, are described in a six-page illustrated folder released by The Udylite Corp., Detroit 11, Michigan.

15. Synthetic Finish

"Dimenso," a synthetic finish that is designed to provide two colors in one spray operation, is described in a booklet now available from The Sherwin-Williams Co., Cleveland 1, Ohio.

16. Alodizing

A rapid, effective, and economical process for protecting aluminum and anchoring paint is described in a four-page illustrated technical service data sheet released by the American Chemical Paint Co., Ambler, Pennsylvania.

17. Metal Parts Cleaning

An illustrated bulletin describing equipment and detergents for modern metal parts cleaning operations is now being offered by the Optimus Equipment Co., Matawan, N. J.

18. Infra-Red Ovens and Conveyors

A 20-page catalog published by Jensen Specialties, Inc., Detroit 27, Mich., illustrates and explains the advantages of coordinating infra-red ovens with conveyors in performing baking, drying, preheating and dehydrating operations.

19. Dust Eliminators

A 12-page folder prepared by Schmieg Industries, Inc., Detroit 2, Mich., presents illustrated, descriptive, and blueprint data on a complete line of swirl type dust and fume eliminators for industry.

20. Parkerizing

A catalog describing applications and advantages of Parkerizing has been issued by the Parker Rust Proof Co., Detroit 11, Mich. Coatings obtainable by Parkerizing various products such as forgings, castings, stampings, and so on, are discussed.

21. Refinishers' Price List

The Rinshed-Mason Co., Detroit 10, Mich., has available Refinishers' Price List No. 107 which lists and describes each item of its line of automotive undercoats and finishing materials.

22. Industrial Ovens

The Kirk & Blum Manufacturing Co., Cincinnati 25, Ohio, has published a descriptive catalog showing installation views of its wide variety of industrial ovens in various types of plants.

23. Silicone-Base Finish

Properties of Mico silicone-base aluminum finish and product applications for the finish are outlined in a folder issued by Midland Industrial Finishes Co., Waukegan, Illinois.

24. Nickel Activator Bulletin

A bulletin describing "Chrometex" a nickel activator used to increase the covering power of chrome, and its application is available from MacDermid Inc., Waterbury 88, Connecticut.

25. Flexible Lacquers

The Randolph Products Co., Carlstadt, N. J., is now offering technical information and specifications on flexible lacquers which can be sprayed, dipped, or baked.

26. Vapor Degreasers

Phillips Manufacturing Co., Chicago 45, Ill., is distributing a booklet entitled "Questions and Answers on Vapor Degreasers."

PRODUCTS FINISHING
431 Main St., Cincinnati 2, Ohio

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Name ..... Title.....

Company .....

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City ..... State.....

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